

QST



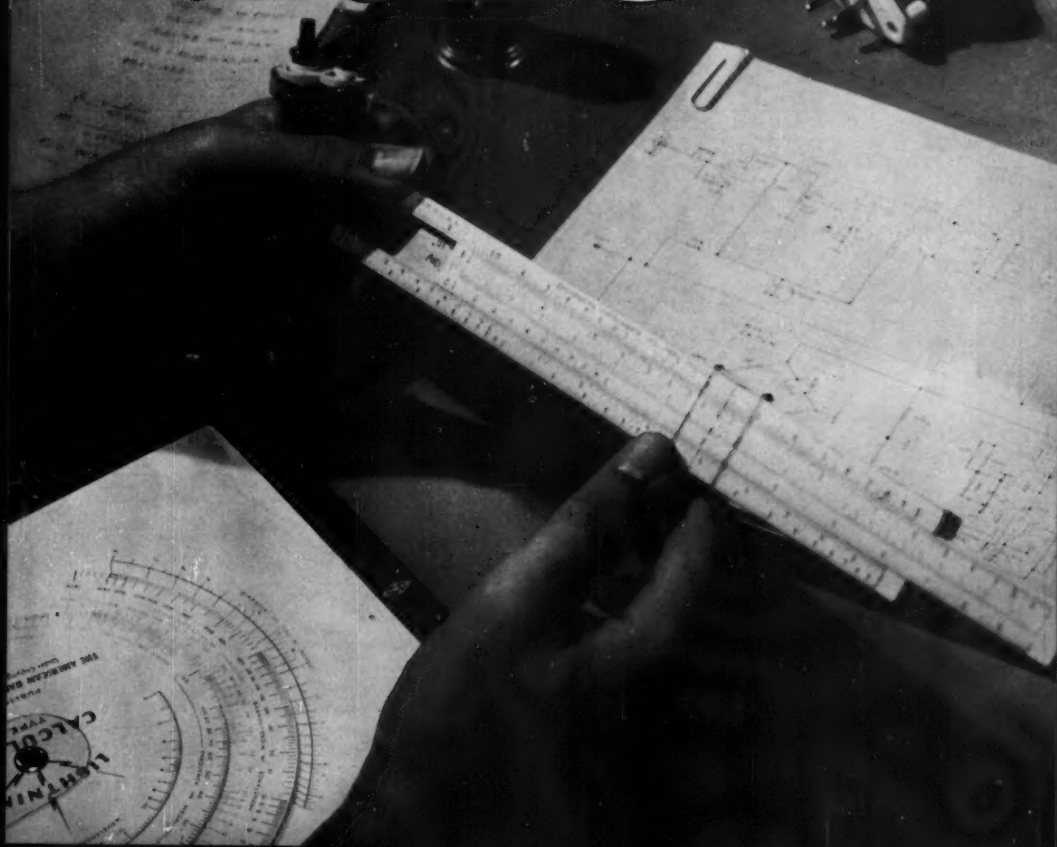
October 1960

50 Cents

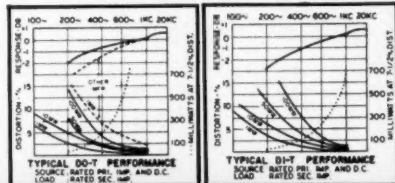
\$5c in Canada

devoted entirely to

amateur radio



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE



No. of Boats	Pr. Imp.	D.C. Ma.& in Pr.	Sec. Imp.	Pr. Res. Boat	Pr. Res. Boat	Mw. Level	DI-T No.
DI-T1	20,000 30,000	.5 .5	800 1200	850	815	50	DI-T1
DI-T2	500 600	3 3	60 60	60	65	100	DI-T2
DI-T3	1000 1200	3 3	50 60	115	110	100	DI-T3
DI-T4	600	3	3.2	60		100	
DI-T5	1200	2	3.2	115	110	100	DI-T5
DI-T6	10,000	1	3.2	790			
DI-T7	200,000 500	0 0	100,000 100	8500		25	
DI-T8	Reactor 2.5 Hys./2 Ma., 9 Hy./4 Ma " 3.5 Hys./2 Ma., 1 Hy./5 Ma.					630	DI-T8
DI-T9	10,000 12,000	1 1	500 CT 600 CT	800	870	100	DI-T9
DI-T10	10,000 12,500	1 1	1200 CT 1500 CT	800	870	100	DI-T10
DI-T11	10,000 12,500	1 1	2000 CT 2500 CT	800	870	100	DI-T11
DI-T12	150 CT 300 CT	10 10	12 16	11		500	
DI-T13	200 CT 400 CT	7 7	12 16	20		500	
DI-T14	600 CT 800 CT	5 5	12 16	43		500	
DI-T15	800 CT 1070 CT	4 4	12 16	51		500	
DI-T16	1000 CT 1330 CT	3.5 3.5	12 16	71		500	
DI-T17	1500 CT 2000 CT	3 3	12 16	108		500	
DI-T18	7500 CT 10,000 CT	1 1	12 16	505		500	
DI-T19	300 CT	7	600	19	20	500	DI-T19
DI-T20	500 CT	5.5	600	31	32	500	DI-T20
DI-T21	900 CT	4	600	53	53	500	DI-T21
DI-T22	1500 CT 600	3 5	600 800 CT	86 —	87	500	DI-T22
DI-T23	20,000 CT 30,000 CT	.5 .5	1500 CT 1200 CT	850	815	100	DI-T23
DI-T24	200,000 CT 500 CT	0 0	100,000 CT 100	8500		25	
DI-T25	10,000 CT 12,000 CT	1 1	1800 CT 1500 CT	800	870	100	DI-T25

DO- No.	Pri. Imp.	D.C. Ma. in Pri.	Sec. Imp.	Pri. Res. DO- Res.	Pri. Res. DI- T.	Mw. Level	DI- No.
	Reactor 4.5 Hys./2 Ma., 1.2 Hys./4 Ma. " 6 Hys./2 Ma., 1.5 Hys./5 Ma. 2100				2300		DI-726
DO-726		Reactor 9 Hys./2 Ma., 5 Hys./6 Ma.				105	DI-727
DO-727		" 1.25 Hys./2 Ma., 5 Hys./11 Ma. 100					
		Reactor 1 Hys./4 Ma., .08 Hys./10 Ma.				25	DI-728
DO-728		" 3 Hy./4 Ma., .15 Hys./20 Ma. 25					
DO-729	120 CT 150 CT	10 10	3.2 4	10		500	
DO-730	320 CT 400 CT	7 7	3.2 4	20		500	
DO-731	640 CT 840 CT	5 5	3.2 4	43		500	
DO-732	800 CT 1000 CT	4 4	3.2 4	51		500	
DO-733	1060 CT 1330 CT	3.5 3.5	4	71		500	
DO-734	1600 CT 2000 CT	3 3	3.2 4	109		500	
DO-735	6000 CT 10,000 CT	1 1	3.2 4	505		100	
DO-736	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	950	970	100	DI-736
*DO-737	2000 CT 2500 CT	3 3	8000 Split 10,000 Split	195		100	
*DO-738	10,000 CT 12,000 CT	1 1	2000 Split 2400 Split	560		100	
*DO-739	20,000 CT 30,000 CT	5 5	1000 Split 1500 Split	800		100	
*DO-740	40,000 CT 50,000 CT	25 25	400 Split 500 Split	1700		50	
*DO-741	400 CT 500 CT	8 6	400 Split 500 Split	46		500	
*DO-742	400 CT 500 CT	8 6	120 Split 150 Split	46		500	
*DO-743	400 CT 500 CT	8 6	40 Split 50 Split	46		500	
*DO-744	80 CT 100 CT	12 10	32 Split 40 Split	9.8		500	

DQ-TSH Drawn Hipermalloy shield and cover 20/30 db DI-TSH

‡ DCMA shown is for single ended usage (under 5% distortion—100MW—1KC) . . . for push pull, DCMA can be any balanced value taken by .5W transistors (under 5% distortion—500MW—1KC)

† DO-T & DI-T units designed for transistor application only. Pats. Pend.

* DQ-T37 thru DQ-T44 newly added to series.

Hallicrafters Quality...

(at down-to-earth prices)



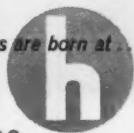
Today... you can be on the air with single sideband! This is the combination whose price makes it possible—whose performance makes it a great new experience.

HT-37 Transmitter \$450.00 A precision-engineered CW/AM/SSB transmitter with the same power, rugged construction, and long-term frequency and carrier suppression stability as the famous HT-32. Sideband suppression 40 db. at 1000 CPS. Power rating: 70-100 watts P.E.P. output CW or SSB. 17-25 watts carrier on AM phone. 3rd and 5th order distortion products down 30 db. Instant CW CAL signal from any transmission mode. Ideal CW keying; full voice control system. 52-ohm pi network output for harmonic suppression.

SX-111 Receiver \$249.50 Here's a CW/AM/SSB receiver with the essential performance characteristics of the renowned SX-101. CW/AM/SSB reception; complete coverage: 80, 40, 20, 15 and 10 meters in 5 separate bands, 6th band tunable to 10 Mc. for WWV. Upper/lower sideband selection; sensitivity: 1 microvolt on all bands; 5 steps of selectivity: 500 to 5000 cycles. Dual conversion, crystal controlled 2nd converter, famous Tee-Notch filter, built-in crystal calibrator. Separate AM and SSB detectors.

Also shown: The Stradivarius of electronic keyers—HA-1 T.O. Keyer—\$79.95; and the R-48 Speaker—\$19.95.

the new ideas in communications are born at



Export Sales: International Div.,
Raytheon Mfg. Co., Waltham, Mass.
Canada: Gould Sales Co., Montreal, P.Q.

hallicrafters

Chicago 24, Illinois

COLLINS KWM-2

two hamshacks—one transceiver

Out of your ham shack and into your mobile unit is a quick and easy operation when you own a Collins KWM-2 Mobile Transceiver.

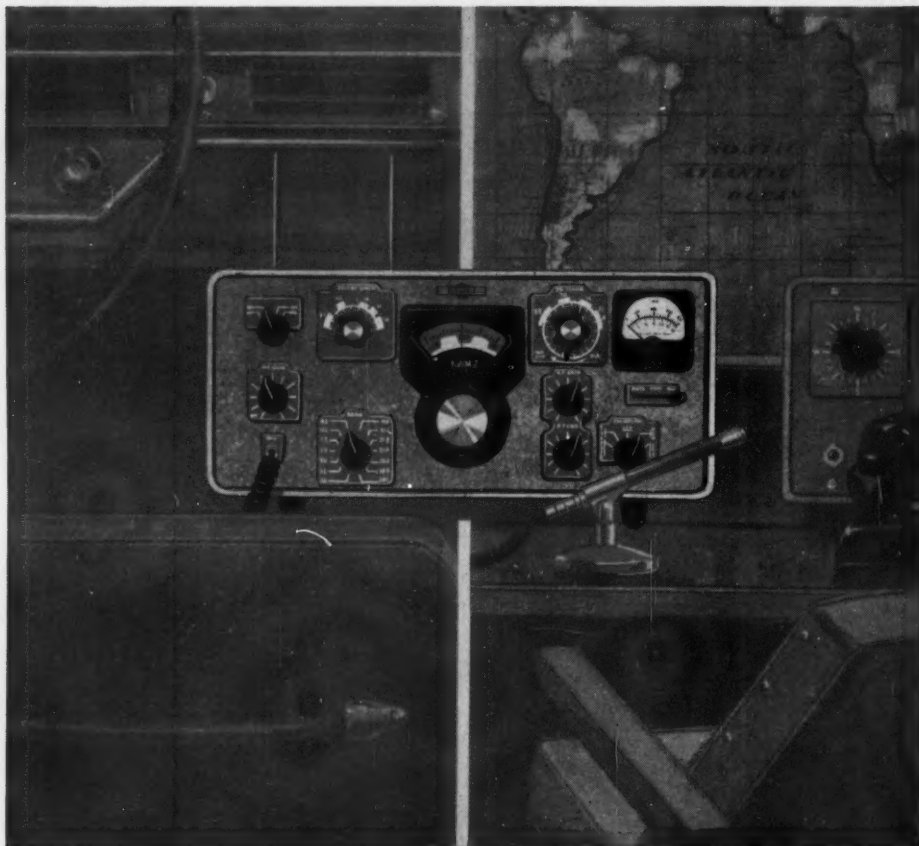
The KWM-2 connects instantly to the power supply, antenna, antenna selector and car radio speaker when it is slipped into its specially designed mobile mount.

Just plug in one of Collins Mobile Microphones and you're on the air ready to work any of the amateur bands between 3.4 and 29.7 mc.

To experience versatility, mobility and fixed station performance plus Collins craftsmanship and advanced design, try the KWM-2 at any of the 103 Collins Distributors.



COLLINS RADIO COMPANY • CEDAR RAPIDS, IOWA • DALLAS, TEXAS • BURBANK, CALIFORNIA



PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

STAFF

A. L. BUDLONG, WIBUD
Editor

RICHARD L. BALDWIN, W1KE
Managing Editor

GEORGE GRAMMER, W1DF
Technical Editor

DONALD H. MIX, WITS
BYRON GOODMAN, W1DX
MASON P. SOUTHWORTH, W1VLH
Assistant Technical Editors

EDWARD P. TILTON, W1HDQ
V.H.F. Editor

LEWIS G. MCCOY, W1ICP
E. LAIRD CAMPBELL, W1CUT
Technical Assistants

ROD NEWKIRK, W9BRD
Contributing Editor, DX

ELEANOR WILSON, W1QON
Contributing Editor, YLs

SAM HARRIS, W1FZJ
HELEN HARRIS, W1HOY
Contributing Editors, V.H.F.

FRANCES MATTHESEN
Production Assistant

LORENTZ A. MORROW, W1VIG
Advertising Manager

EDGAR D. COLLINS
Advertising Assistant

Chris Dunkle and Associates
740 S. Western Ave.
Los Angeles 5
California Representative

DAVID H. HOUGHTON
Circulation Manager

I. A. MOSKEY, W1IMY
Assistant Circulation Manager

OFFICES

38 La Salle Road
West Hartford 7, Connecticut
TEL.: A Dams 6-2535

Subscription rate in United States and Possessions, \$5.00 per year, postpaid; \$5.25 in the Dominion of Canada; \$6.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Second-class postage paid at Hartford, Conn., and at additional mailing offices.

Copyright 1960 by the American Radio Relay League, Inc. Title registered at U. S. Patent Office. International copyright secured. All rights reserved.

Quedan reservados todos los derechos.

Printed in U. S. A.

INDEXED BY

Applied Science and Technology
Index
Library of Congress Catalog
Card No.: 21-9421

—CONTENTS—

TECHNICAL —

Stability with Simplicity... George D. Hanchett, W2YM	11
Meter Reading by Sound..... Ken Blaney, W6PIV	14
Compression Tuning in the V.H.F. Range	
Mayer Savetman	16
A Dummy Load off the Mind.... John Howard, K8MME	18
Switching Coaxial Feed Lines... Gene Hubbell, W9ERU	19
Screen Protection and More... John A. Evans, W9HRH	22
The "Ultimatic" — Transistorized, Part II	
Alvin F. Kanda, K0MHU, ex-KH60J	31
High-Frequency Crystal Filters for S.S.B.	
D. J. Healey, W3HEC	35
Technical Correspondence.....	42
Recent Equipment:	
Hammarlund HX-500 Transmitter.....	45

BEGINNER & NOVICE —

A Limited-Space Antenna.... Lewis G. McCoy, W1ICP	23
---	----

MOBILE —

Two-Band Mobile Station..... S. B. Leslie, WSDQV	26
--	----

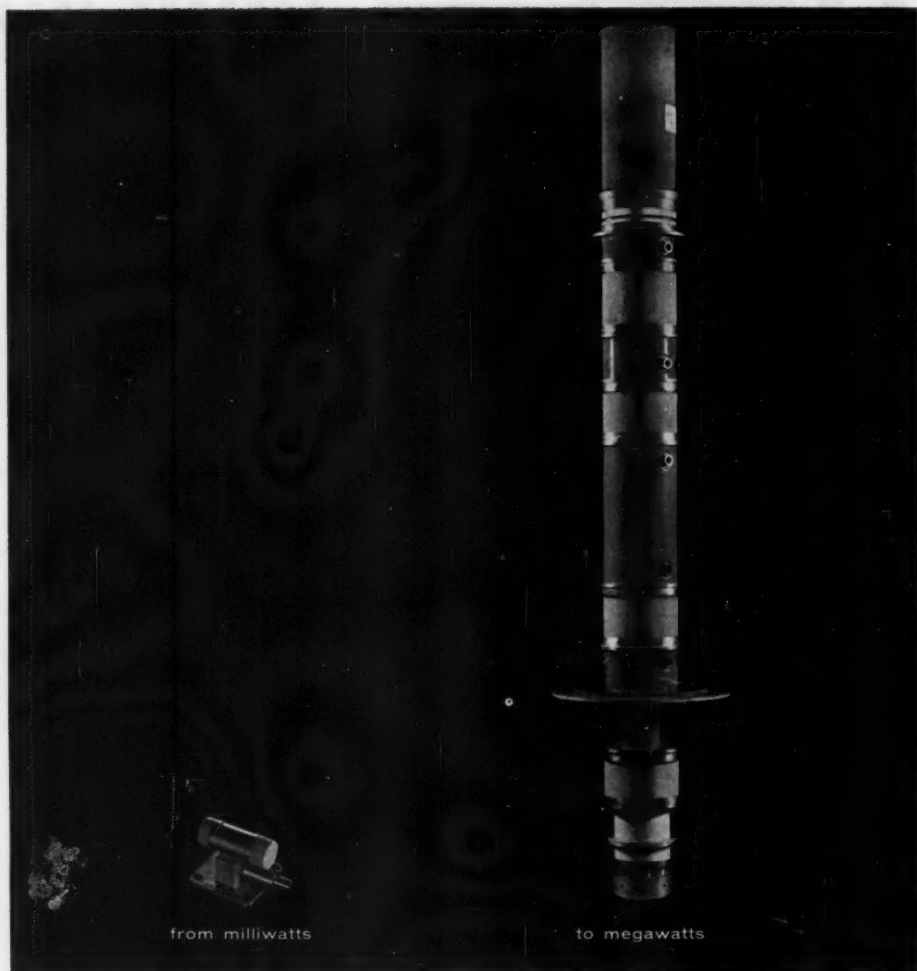
OPERATING —

Annual Simulated Emergency Test — Announcement...	49
June V.H.F. Party Results Supplement.....	49
26th ARRL International DX Competition — Official Results.....	52
RTTY Sweepstakes — Announcement.....	66
27th ARRL Sweepstakes — Announcement.....	72

GENERAL —

Project Hope.....	10
Home-built Stations.....	73
Operation Alert — 1960..... George Hart, W1NJM	80

"It Seems to Us..."	9	IARU News.....	74
Coming Conventions.....	10	World Above 50 Mc.....	76
Great Lakes Div. Convention...	10	Correspondence from Members.	84
Hamfest Calendar.....	10	Operating News.....	85
Our Cover.....	10	Station Activities.....	94
In QST 25 Years Ago.....	18	Feedback.....	182
New Books.....	25, 48	Silent Keys.....	170
Hints and Kinks.....	50	ARRL QSL Bureau.....	172
YL News and Views.....	63	Index to Advertisers.....	182
How's DX?.....	67		

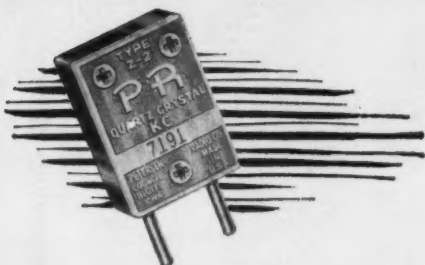


EIMAC OFFERS RF POWER FOR ALL AIR-SPACE SYSTEMS

From miniature microwave devices to the highest power klystron, Eimac offers rf power for every type of air-space system. With tubes designed for airborne communication. For warning systems. For tracking and guidance. You can look to Eimac as the one source of all your rf power needs. ■ For still further progress, new tube types to meet new needs, Eimac continues to forge ahead with the most advanced research facilities available today for power tube development. And its manufacturing program is unmatched in ability to turn blueprint ideas into quantity production. No wonder Eimac tubes power nearly every major air-space system the world over: telemetry, troposcatter, navigational radar, high-power radar—including the recent BMEWS program. Eitel-McCullough, Inc., San Carlos, Calif.



ONLY THE BEST IS GOOD ENOUGH!



In many respects, Crystals are like "diamonds." You can buy them from six-bits up. It may be difficult to tell quality from a distance, but measured under close-up of performance, accuracy and stability . . . quality stands out. After all, your frequency control is the heart of your transmitter. When you trust your frequency to PR you know where you are . . . today, tomorrow and years from now. This is worth


a great deal. In the long run the money you put in a crystal is not important . . . because even quality PRs cost little. When you buy a PR from your jobber you can get the exact frequency you want (integral kilocycle) within amateur bands, at no extra cost. You can be where you want to be . . . not within 5, 10 or 15 KC., but **JUST WHERE YOU WANT TO BE!** That means a lot.

40 and 80 Meters, PR Type Z-2.....\$2.95

Citizens Band, Type Z-9R.....\$2.95



Crystals



USE  AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. OES appointment is available to Novices and Technicians.

ATLANTIC DIVISION			
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.
Maryland-Delaware-D. C.	W3BKE	Thomas B. Hedges	2202 Culver St.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive
Western Pennsylvania	W3UHN	Anthony J. Mroczka	475-5th St.
CENTRAL DIVISION			
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.
Indiana	W98WD	Clifford M. Singer	7070 East 21st St.
Wisconsin	W9KQB	George Wolden	2023 South 10 St.
DAKOTA DIVISION			
North Dakota	W0HVA	Harold A. Wengel	821-14th St.
South Dakota	W0RRN	J. W. Sikorski	1900 S. Menlo Ave.
Minnesota	W0KJZ	Mrs. Lydia S. Johnson	1258 Van Buren St.
DELTA DIVISION			
Arkansas	W5ZZY	Ulmon M. Golings	P. O. Box 207
Louisiana	W5FMO	Thomas J. Morgavi	3409 Beaulieu St.
Mississippi	W5MUG	Floyd C. Teetsen	2469 Paden
Tennessee	W4UJO	R. W. Ingraham	105 West Park Drive
GREAT LAKES DIVISION			
Kentucky	W48UD	Robert A. Thomason	626 Eastwood Drive
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road
Ohio	W8AL	Wilson E. Weckel	2118 Tuscarawas St., W.
HUDSON DIVISION			
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive
N. Y. C. & Long Island	W2TUK	Harry J. Dainals	RFD 1, Arbor Lane, Dix Hills
Northern New Jersey	K2MFF	J. S. Jaksas	30 Kelly Parkway
MIDWEST DIVISION			
Iowa	W0BDR	Russell B. Marquis	807 North Fifth Ave.
Kansas	W0FNS	Raymond E. Baker	1014 Lincoln St.
Missouri	W0BTL	C. G. Gosh	711 S. Oakland St.
Nebraska	W0EXP	Charles E. McNeel	Route 3, RFD
NEW ENGLAND DIVISION			
Connecticut	W1TYQ	Victor L. Crawford	RFD 5, Stadley Rough Rd.
Maine	W1JMN	Jeffrey J. Weinstein	79 Caleb St.
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	91 Atlantic St.
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.
New Hampshire	W1RMH	Robert H. Wright	18 Pine St.
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.
Vermont	W1EIB	Mrs. Harriet Proctor	P. O. Box 9
NORTHWESTERN DIVISION			
Alaska	K17DG	John P. Trent	P. O. Box 82
Idaho	W7GGV	Mrs. Helen M. Maillet	Route 1, South
Montana	W78FK	Ray Woods	
Oregon	W7JDX	Hubert R. McNally	11908 S.E. Madison St.
Washington	W7PGY	Robert B. Thurston	7700-31st Ave., N.E.
PACIFIC DIVISION			
Hawaii	KH6AED	Samuel H. Lewbel	P. O. Box 3564
Nevada	W7VIU	Charles A. Rhines	Box 1025
Santa Clara Valley	K6DYX	W. Conley Smith	87 Cuesta Vista Drive
East Bay	W6QJW	B. W. Southwell	200 South Seventh St.
San Francisco	K6ANP	Leonard R. Gerardi	1500 Cayuga Ave.
Sacramento Valley	W6GDO	Jon J. O'Brien	6606-5th St.
San Joaquin Valley	W6JPU	Ralph Sarayan	6204 E. Townsend Ave.
ROANOKE DIVISION			
North Carolina	W4RRH	B. Riley Fowler	Box 143
South Carolina	W4GQV	Dr. J. O. Dunlap	P. O. Box 447
Virginia	W4QJY	Robert L. Folmar	1057 Dune St.
West Virginia	W8JMJ	Donald B. Morris	1111 Alexander Place
ROCKY MOUNTAIN DIVISION			
Colorado	W0BBWJ	Carl L. Smith	1070 Locust St.
Utah	W7QWH	Thomas H. Miller	1420 E. 3045 St.
New Mexico	K5IQL	Newell F. Greene	504 West Second St.
Wyoming	W7AMU	L. D. Branson	342 South Elk
SOUTHEASTERN DIVISION			
Alabama	K4AOZ	William D. Detherow	572 Park Ave.
Eastern Florida	W4KQJ	John F. Porter	Box 7295, Ludlam Branch
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.
Georgia	W4CFE	William F. Kennedy	1687 Fairway Hill Drive, S.E.
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	363 Ramon Lovet
Canal Zone	KZ5TD	Thomas B. DeMels	P. O. Box 1111
SOUTHWESTERN DIVISION			
Los Angeles	W6JQB	Albert F. Hill, Jr.	861 No. Millard Ave.
Arizona	W7QZH	Kenneth P. Cole	4132 North 18th Ave.
San Diego	W6LRU	Don Stansifer	4427 Pescadero
Santa Barbara	K6CVR	Robert A. Henke	728 W. Mission
WEST GULF DIVISION			
Northern Texas	W5BNG	L. L. Harbin	4515 Calmont
Oklahoma	W5DRZ	Adrian V. Rea	917 Osage
Southern Texas	W5QEM	Roy K. Eggleston	1109 Vernon Drive
CANADIAN DIVISION			
Maritime	VE1WB	D. E. Weeks	170 Norton Ave.
Ontario	VE3NG	Richard W. Roberts	62 St. Johns Rd.
Quebec	VE2DR	C. W. Skarstedt	
Alberta	VE6KC	Kenneth G. Curry	11114-80th Ave.
British Columbia	VE7JT	Peter M. McIntyre	981 West 26th Ave.
Yukon	VE4JY	M. S. Watson	249 Lanark St.
Manitoba	VE5HR	H. R. Horn	2121 Ewart Ave.
Saskatchewan			
			Tamaqua
			Washington 21, D. C.
			Palmyra
			Buffalo 26
			Donora
			Springfield
			Indianapolis
			Manitowoc
			Bismarck
			Sioux Falls
			St. Paul 4
			Oseola
			Metairie
			Jackson 4
			Kingsport
			Owensboro
			Detroit
			Canton 8
			Schenectady
			Huntington, L. I.
			Bayonne
			Marshalltown
			Neodesha
			Webb City
			North Platte
			Danbury
			Portland
			North Quincy 71
			Westfield
			Concord
			Pawtucket
			East Middlebury
			Kodiak
			Postville
			Brady
			Portland 16
			Seattle 15
			Honolulu
			Elko
			Monterey
			Dixon
			San Francisco 12
			Rio Linda
			Fresno
			Morganton
			Rock Hill
			Norfolk 3
			Fairmont
			Denver 20
			Salt Lake City
			Roswell
			Casper
			Birmingham 9
			Miami 55
			Fort Walton Beach
			Atlanta 17
			Trueman
			Rio Piedras, P. R.
			Bahoa
			Rialto
			Phoenix
			San Diego 7
			Santa Barbara
			Fort Worth 7
			Muskogee
			Corpus Christi
			Harvey Station, N. B.
			Willowdale, Toronto, Ont.
			Pointe Claire
			Montreal 33, P. Q.
			Edmonton, Alta.
			Vancouver, B. C.
			Winnipeg
			Saskatoon

*Official appointed to act temporarily in the absence of a regular official.

ONE PART IN 100,000,000 STABILITY



SIGNAL GENERATOR

MODEL

CPO

AN/URA-31

TECHNICAL SPECIFICATIONS

FREQUENCY RANGE:	1.75 to 33.75 megacycles in 100 cps steps.
FREQUENCY CONTROL:	All frequency determining elements referenced to a built-in 1 mc source.
FREQUENCY STABILITY:	1 part in 10^8 per day under normal fixed station operating conditions.
OUTPUT POWER:	Continuously adjustable from zero to 1 watt.
OUTPUT IMPEDANCE:	72 ohms nominal.
SPURIOUS SIGNALS:	All non-harmonic spurious frequencies above 60 cycles, down at least 60 db.
INPUT POWER:	115/230 volts, 50-60 cps, single phase.
SIZE:	All units of the CPO-1 require only $52\frac{1}{2}$ inches of standard 19 inch relay rack space.

For full detailed
information write for
Bulletin 241

The TECHNICAL MATERIEL CORPORATION
MAMARONECK, NEW YORK

THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



Past Presidents

HIRAM PERCY MAXIM, WIAW, 1914-1936
EUGENE C. WOODRUFF, W8CMP, 1936-1940
GEORGE W. BAILEY, W2KH, 1940-1952

Officers

President GOODWIN L. DOSLAND, W0T5N
Moorhead, Minnesota
First Vice-President WAYLAND M. GROVES, W5NW
P.O. Box 586, Odessa, Texas
Vice-President FRANCIS E. HANDY, W1BDI
38 La Salle Road, West Hartford, Connecticut
Vice-President ALEX REID, VE2BE
240 Logan Ave., St. Lambert, P. Q., Canada
Secretary A. L. BUDLONG, W1BUD
38 La Salle Road, West Hartford, Connecticut
Treasurer DAVID H. HOUGHTON
38 La Salle Road, West Hartford, Connecticut

General Manager A. L. BUDLONG, W1BUD
Communications Manager FRANCIS E. HANDY, W1BDI
Technical Director GEORGE GRAMMER, W1DF
Assistant General Manager JOHN HUNTOON, W1WQ
Assistant Secretaries PERRY F. WILLIAMS, W1UW
GEORGE STEVANS, JR., K1LVW
38 La Salle Road, West Hartford, Connecticut

General Counsel PAUL M. SEGAL
816 Connecticut Ave., Washington 6, D. C.

DIRECTORS

Canada

NOEL B. EATON VE3CJ
R.R. 3, Burlington, Ontario
Vice-Director:

Atlantic Division

GILBERT L. CROSSLEY W3YA
Dept. of E. E. Penna State University
State College, Pa.
Vice-Director: Edwin S. Van Deusen W3ECP
3711 McKinley St., N.W., Washington 16, D. C.

Central Division

JOHN G. DOYLE W9GPI
4331 N. Wildwood Ave., Milwaukee 11, Wis.
Vice-Director: Philip E. Haller W9HPG
6000 S. Tripp Ave., Chicago 29, Ill.

Dakota Division

CHARLES G. COMPTON W0BUO
1011 Fairmount Ave., St. Paul 5, Minn.
Vice-Director: Martha J. Shirley W0ZWL
Box 78, Black Hawk, S. D.

Delta Division

SANFORD B. DE HART W4RRV
227 S. Purdue Ave., Oak Ridge, Tenn.
Vice-Director: Victor Canfield W5B8R
Box 965, Lake Charles, La.

Great Lakes Division

DANA E. CARTWRIGHT W8UPH
2979 Observatory Ave., Cincinnati 8, Ohio
Vice-Director: Robert B. Cooper W8AQA
132 Guild St., N.E., Grand Rapids 5, Mich.

Hudson Division

MORTON B. KAHN W2K8R
22 Birch Hill Rd., Great Neck, N. Y.
Vice-Director: Lloyd H. Manamon W2VQR
709 Seventh Ave., Asbury Park, N. J.

Midwest Division

ROBERT W. DENNISTON W0NWX
Box 631, Newton, Iowa
Vice-Director: Sumner H. Foster W0GQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa

New England Division

MILTON E. CHAFFEE W1EFW
53 Homesdale Ave., Southington, Conn.
Vice-Director: Carmine A. Polo W18JO
17 Park St., West Haven 16, Conn.

Northwestern Division

R. REX ROBERTS W7CPS
837 Park Hill Drive, Billings, Mont.
Vice-Director: Harold W. Johnston W7PN
2727 Belvidere Ave., Seattle 6, Wash.

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director: Ronald G. Martin W6ZF
1011 Terrace Drive, Napa, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Joseph F. Abernethy W4AKC
768 Colonial Drive, Rock Hill, S. C.

Rocky Mountain Division

CLAUDE M. MAER, JR. W0IC
485 Race St., Denver 6, Colo.
Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah

Southeastern Division

JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta 17, Ga.
Vice-Director: Thomas M. Moss W4HYW
P.O. Box 644, Municipal Airport Branch,
Atlanta 20, Ga.

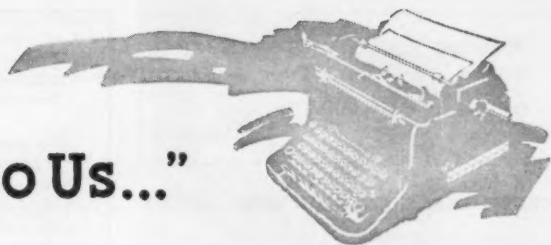
Southwestern Division

RAYMOND E. MEYERS W6MLZ
717 Anderson Way, San Gabriel, Calif.
Vice-Director: Virgil Talbott W6GTE
1175 Longhill Way, Monterey Park, Calif.

West Gulf Division

GRADY A. PAYNE W6SETA
5103 Linden St., Bellaire, Texas
Vice-Director: Robert D. Reed W5KY
4339 S. Peoria, Tulsa 5, Okla.

"It Seems to Us..."



20-METER COOPERATION

Amateur radio is a hobby. Most of us keep it a hobby most of the time. Occasionally, though, some of us get a little too involved in our own favorite phase of hamming and temporarily lose our perspective. This occasional blind spot can — and indeed it has at times — lead to feuding between amateurs enjoying different facets of the hobby, or different modes of operation.

There have recently been rumblings of discontent concerning twenty meters. Over the years, operators using a.m. and operators using s.s.b. had spontaneously developed an informal system on 14 Mc. under which the a.m. contingent occupied, roughly, the bottom half of the voice band and the sidebanders stuck pretty well to the top half. DX sideband worked above 14,300, and the foreigners with carriers worked below 14,200. Though generally accepted by most hams on the band, no one pushed it; the plan simply arose from the need for a workable arrangement, and by way of the spirit of cooperation so notable in amateur radio — admittedly, however, not without some preliminary skirmishing as s.s.b. grew.

Earlier this year this working arrangement was temporarily upset by expansion of the 20-meter phone band to 14,350 kc. Readjustment, to some extent still in process, has certainly not been easy, nor without its moments of heated discussions. Some amateurs expressed the desire to have FCC "do something." A few tried mob rule, landing with brute force on any stations using the opposite mode in what they consider "their" territory. Others thought the League should lay down an edict for band usage.

Whether or not one likes the principle of calling on FCC to solve what are really internal problems, in this case the question was moot as the Commission long ago declared that it doesn't look with favor on any further regulatory action to subdivide the amateur bands by various modes.

As for the League, no one person sitting in the editorial chair, even with a number of experienced staff people to guide him, is capable of coming up with a Utopian answer to practical operating problems. Such an

answer can come only from users of a band themselves, on a trial-and-error basis, until such experimental methods show one system or another to be the desired one.

We could be wrong, but from where we sit it seems to us that the ham spirit is getting results once again. There appears a trend to general agreement about where to fire up in the band for a.m., where to use s.s.b., and where to listen for DX on each mode, with at least 90% of the hams cooperating. We seem to have the lowest 100 kc. reasonably free for c.w.; from there up to 14,200 used by DX a.m. voice stations; the U. S. voice band divided very roughly in half, with a.m. at the bottom and sideband near the top; and some space at the 14,350 edge for rare sidebanders to get through.

True, we still have a few complaints that one group or the other is hogging the band, and indeed there may be a few stations still not operating in accordance with the unwritten agreement. The best way to handle these cases is for each group to suggest to its own non-conformists that cooperation between all amateurs is an essential ingredient in our continued efficient use of amateur frequencies. We should avoid at all costs the prospect of some operators "punishing" members of the other group heard outside the generally-accepted frequencies.

And while we're on the subject, we should also like to commend the amateurs outside the United States for their understanding and forbearance. We are well aware that the ARRL's request for expansion of the phone band here, and FCC's affirmative action, are not popular overseas. Yet most of the DX amateurs seem to be sympathetic with the seriousness of the phone QRM problem in the States which results from our having two-thirds of the total amateur population in this country alone. Our DX friends have been in general most gracious in accepting the new allocations and adjusting their own operations accordingly.

Truly, the 20-meter problem is an outstanding example of the friendly cooperation which has existed among the world's radio amateurs since the earliest days; we hope this spirit will long prevail.

QST

COMING A.R.R.L. CONVENTIONS

October 7-8—Great Lakes Division,
Cleveland, Ohio.

October 14-15—Hudson Division, New
York City, New York.

GREAT LAKES DIVISION CONVENTION

Cleveland, Ohio—October 7-8, 1960

The Great Lakes Division ARRL Convention is to be held on Friday and Saturday, October 7-8 in Cleveland, Ohio. September QST incorrectly stated that the convention program and banquet includes Sunday. Group suppers and several hospitality shows are scheduled for Friday evening, October 7 with the main portion of the convention program to begin Saturday morning at 10 o'clock with a banquet concluding activities Saturday evening. For Great Lakes Division Convention registration and banquet tickets, write the Cleveland Amateurradio Convention Committee, P. O. Box 5167, Cleveland 1, Ohio.



Illinois—The annual Chicago RTTY meeting will be held on Sunday, October 9, with the afternoon technical session being held in the cafeteria at the Hallcrafters Co., 1000 S. Kostner Ave., Chicago. The cafeteria will be open at 1030 for ragchewing. Dinner tickets, at \$4.50 each and limited to the first 75, are available from George M. Boyd, W9SPT, c/o The Hallcrafters Co., 4401 West Fifth Ave., Chicago 24. There is no charge for the technical session, which will feature equipment displays, short technical talks, and a question-and-answer period.

New York—The sixth annual v.h.f. roundup sponsored by the Syracuse V.H.F. Club will be held on October 8 at the Three Rivers Inn, 8 miles north of Syracuse on Route 57. Take Thruway Exit 38. Registration starts at 1030 and the formal program at 1330. Speakers include W1HDQ from QST, K2LMG from GE, and W2UKL also from GE. There will be an afternoon program for the ladies, and in the evening a banquet and floor show. Admission is by advance registration only, with tickets at \$5.50 per person from Howard S. Lawrence, K2TXG, 317 Clover Ridge Drive, Syracuse.

New York—The Northeastern DX Association will hold its annual dinner meeting on Saturday, October 8, at 1930 at the Hot Shoppes Restaurant and Towne House Motel in Albany. Dinner tickets are \$5.00, and any active DXCC member is welcome. A DXpedition movie will be shown as part of the program. The menu includes a choice of roast beef or turkey—please state your choice when making your reservations. Motel reservations are also available. All reservations must be in by October 1, and should be sent to O. J. Weiss, jr., K2VUU, 117 Shaker Rd., Albany 11.

Ohio—The Fall Fun-Fest of the Miami Valley V.H.F. Club will be held on Saturday, October 1, at the Engineer's Club at 110 E. Monument Ave., Dayton. The program includes technical talks, hidden transmitter hunts on 50, 144, and 420 Mc., morning and afternoon programs for the XYLs and a big banquet. Banquet speaker will be W3ZM, U.S. allocations committee spokesman at the recent Geneva conference. Registration is \$1.50, banquet tickets are \$3.50 each, and the banquet tickets must be ordered and paid for by Sept. 29. Contact E. Gillespie, K8MDX, 1351 Aleott, Dayton 6.

OUR COVER

What hand and brain went ever paired
What heart alike conceived and dared
What act proved all its thought had been

—Robert Browning

No need for a question like that, sire. This happens all the time in our Technical Department. Specifically, this month's cover shows some of the coordination between hand and brain that was necessary in the design and construction of a small phasing-type sideband generator that is being worked on for the 1961 *Handbook*. Who recognizes those hands?

Project Hope—W8OLJ

In late September a fully-equipped hospital ship, the *Hope*, will sail from San Francisco for an extended itinerary through southeast Asia. Aboard will be doctors, dentists and nurses who are volunteering their time to bring American medical skills and techniques to the people of other nations in their own environment. Also aboard will be a 1-kw. s.s.b. amateur station, provided by Hallcrafters Company and operating under the call W8OLJ/MM, for the dual purpose of providing personal communications between personnel and their families back home, and bringing the public-service value of amateur radio to international attention in still another way.

Ralph C. Charbeneau, W8OLJ, of "Operation World-wide" fame, is amateur radio consultant for the project. Normal operating frequencies will be 14,345, 21,445 and 28,650 kc. Keep an ear on these frequencies anytime after late September, both for the pleasure of a contact with the ship and possibly to handle message traffic to relatives of personnel in your vicinity.

A special QSL card will be sent to all contacts. The address for QSLing is Project HOPE, Box 9808, Washington, D. C. This project is not government sponsored, but is being financed by contributions from American companies and individuals under the People-to-People program, so hams who desire to add their support may send it to this same address. However, QSLing will be entirely independent of any donations.

We expect to have more information on Project HOPE in future issues.

FLASH!

Effective September 15 voice bands in Canada were expanded to the following figures:

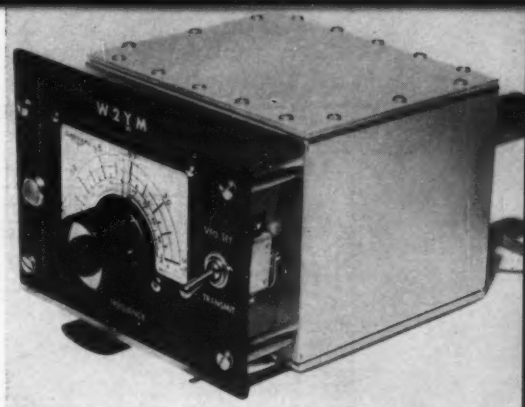
7150-7300 kc.
14,100-14,350 kc.
21,100-21,450 kc.
28,100-29,700 kc.

This action was taken by the Department of Transport responsive to a poll of Canadian amateurs. Details next month.

The panel of the v.f.o. is supported on metal pillars to provide space for the dial mechanism, since the tuning capacitor is firmly mounted on the front side of the shield box. Note the heavy (1/4 inch thick) top and bottom plates for stiffening the aluminum box.

An Easy-To-Build V.F.O. with Cathode-Follower Output

BY GEORGE D. HANCHETT,* W2YM



Stability with Simplicity

IN my 30 years as a radio amateur I have probably built as many v.f.o.s. as anyone else. Because most of them did not meet the standards that I wanted, I kept on seeking the ultimate. Although this v.f.o. may not be, strictly speaking, the ultimate, its performance has been exceedingly good; for this reason I thought others might be interested in this simple design.

Circuit Details

Examination of the circuit, shown in Fig. 1, reveals that basically this oscillator is of the hot-cathode Colpitts type. The 3.5- to 4-Mc. range is spread over practically all of the tuning dial. The effect of changing tube capacitance is minimized by use of a voltage divider consisting of three capacitors, C_4 , C_5 and C_6 , with the tube connected across two of them. The use of fairly large capacitors (0.001 μ f.) at C_5 and C_6 almost completely swamps out the effect of the tube capacitances. The radio-frequency choke, RFC_1 , is used to obtain a d.c. path for the cathode current of the 12AU7-A oscillator. The output of this v.f.o. is obtained from a cathode follower (second triode unit of the 12AU7-A) to minimize the effect on the oscillator of changing output-circuit conditions. The liberal use of silver-mica capacitors assures fairly stable temperature characteristics.

Mechanical Details

As in any variable-frequency oscillator, the mechanical considerations are probably as important as the actual electrical circuit utilized.

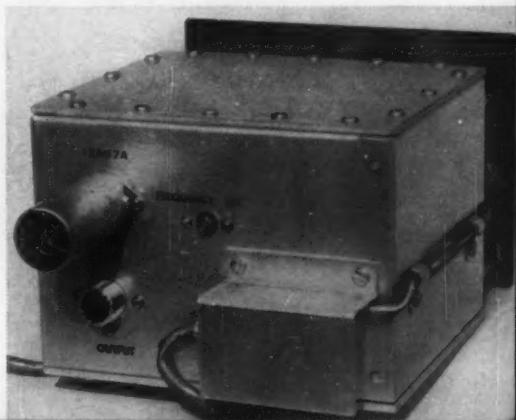
* Electron Tube Division, Radio Corporation of America, Harrison, New Jersey.

External connections, brought out through feedthrough-type capacitors, are covered with a small aluminum "awning" to prevent accidental shock. Wiring to the "zero-operate" switch and dial lamp is cabled and clamped to the side of the box.

There are certainly no complicated circuits or constructional features in this v.f.o., just straightforward application of time-tested principles—which probably explains why it works so well. We put it through its paces when W2YM brought it up to the QST lab, and can heartily recommend it to the most critical user.

As a clincher, several other units have been built to the same design and have duplicated the original's performance.

Therefore, considerable attention has been paid to the mounting of the oscillator components. The complete oscillator is built in a 4 X 5 X 6-inch aluminum utility box. The oscillator tube is mounted horizontally on the back of this box, together with the power and output connectors and the 25- μ f. frequency-setting capacitor. The advantage of this mounting arrangement is that the heat developed by the tube does not have as much effect upon the circuit components as it would if the tube were mounted in a conventional manner inside the box. The tuning capacitor should be a high-quality, two-bearing capacitor. In this oscillator, a Hammarlund MC-140-S capacitor was used.



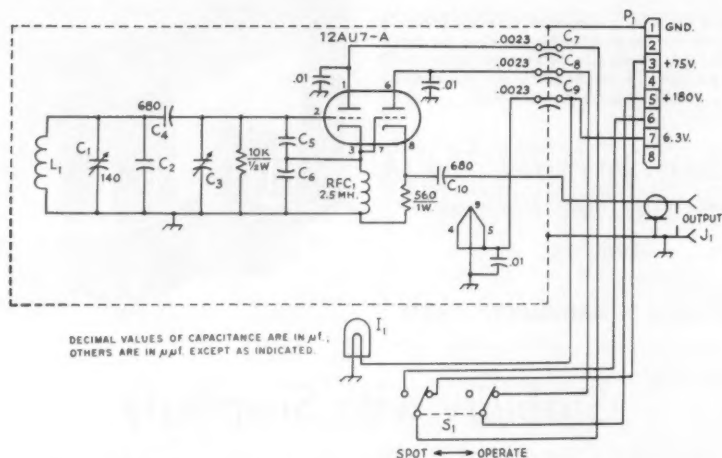


Fig. 1—The v.f.o. circuit. 0.01- μ f. capacitors are disk ceramic. Components outside dashed line are external to the case.

- C₁—140- μ f. variable (Hammarlund MC-140-S).
 C₂—Approximately 100 μ f.; see text.
 C₃—25- μ f. air padder (Hammarlund APC-25).
 C₄—680- μ f., silver mica.
 C₅, C₆—1000- μ f., silver mica.
 C₇, C₈, C₉—Feedthrough type (Centralab FT-2300).

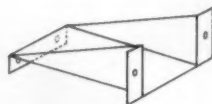
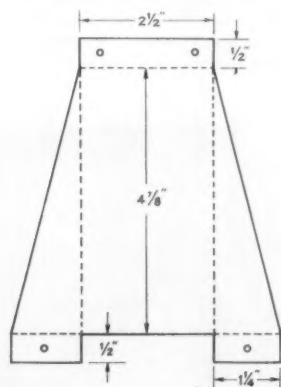
- I₁—6.3-volt pilot lamp.
 J₁—Coaxial connector, chassis-mounting type.
 L₁—14 turns No. 20, 16 turns per inch, 1-inch diameter (B & W 3015).
 P₁—8-prong (octal) cable connector, male.
 S₁—D.p.d.t. toggle.

Maximum rigidity of the oscillator circuit is obtained by use of a special aluminum bracket formed from one of the original box covers, as shown in Fig. 2. The box cover material is soft aluminum and can easily be bent with the aid of wood blocks and a vise. A hardwood block and hammer are used to make the bends square and sharp. The bracket is bolted securely to the front and back of the oscillator box; thus it not only supports the circuit components but also aids considerably in stiffening the box itself. To aid in fitting the variable capacitor, the holes for the mounting feet are slotted, and in assembly the shaft nut is first tightened to the side of the box and then the 6-32 screws for the feet are tightened. Special clamps to hold the coil are cut

from thin Lucite sheet in strips $\frac{1}{4}$ inch wide and $2\frac{1}{2}$ inches long. Holes are drilled at the ends of the strips so that they can be bolted to $\frac{1}{2}$ -inch standoff insulators and, in assembly, the coil is clamped between the two Lucite strips to provide a sturdy coil mounting. The silver-mica capacitors must be mounted so that there is no possibility of any motion. Again, half-inch standoff insulators are used as tie points, as can be seen in the top view. For further stiffening of the unit, new covers were cut from $\frac{1}{4}$ -inch aluminum panel stock and fastened to the box with liberal use of self-tapping screws.

Although the particular arrangement shown uses a National MCN dial mounted on a small panel and bolted to the v.f.o. box with $1\frac{1}{4}$ -inch metal bushings, any dial and panel arrangement can be used. The v.f.o. box is sturdy enough so that it could be completely supported from the panel.

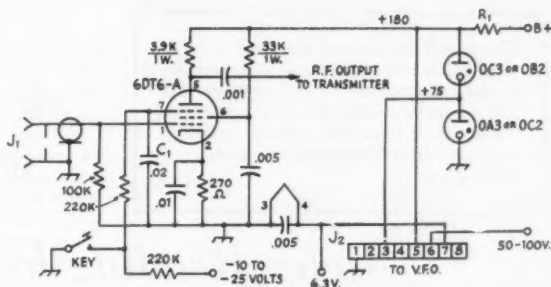
Feedthrough-type bypass capacitors are provided for making power-supply connections to the



FORMED BRACKET
 Holes drilled for 6-32 screw

Fig. 2—Mounting bracket for the tuned-circuit capacitor and inductor.

R₁—25-watt slider type; value dependent on voltage of supply source. Adjust for 30 ma. through VR tubes with key open.



Construction

The construction of the unit is not critical. A typical layout for a $6 \times 3 \times 2$ -inch aluminum Minibox is shown in the sketch of Fig. 2. The cost of components should not exceed \$12.00 or so. Capacitor C_1 may not be needed. It was found necessary to use it with one of the transmitters we tried in order to eliminate hum in the speaker output. Also, C_4 was needed in only one unit in which a miniature Japanese transformer was used. Units having larger transformers did not require it.

The wire leads for the meter connections should be shielded, either individually or as a pair, to prevent r.f. pickup or radiation. The shielding braid should be grounded at both ends, but both meter wires must be kept insulated from ground, of course. An opening will be found somewhere in most transmitter cabinets through which the cable can be passed to the meter. A three-prong connector for the cable will be found convenient if the unit is to be used with more than one piece of equipment.

Calibration of the dial of R_2 is a simple matter. The transmitter is adjusted so that the meter reads full scale. R_2 is set in the full clockwise position (maximum resistance between BT_1 and the arm of the potentiometer). Then, while switching S_2 back and forth from one position to the other, R_1 is adjusted until the audio tones obtained in the two switch positions have the same pitch. For the remainder of the calibration, R_1 remains fixed at this setting. The meter readings are reduced in the desired fractional steps, each time matching the tone obtained with the meter connected and the tone obtained with the switch in the opposite position by adjustment of R_2 . The dial of R_2 is marked at each step. After the calibration is complete, a center punch can be used on the rear side of the dial to make raised markings on the front side which can be easily detected by Braille-sensitive fingers. In use, the matching of tones is surprisingly simple and adjustment is a matter of a few seconds.

Those who object to overloading the rig or detuning it for the short period of time required to get a meter calibration at full scale can disconnect the meter from the transmitter and obtain the deflection by means of a flashlight cell and a variable resistor of 1500 ohms or more in series connected across the meter. Alternatively, the calibration can be started with R_2 and the meter at half scale, and the points above half scale plotted by estimation. Be sure to use a potentiometer with a linear taper if you want dial markings equally spaced.

For the batteries, seven penlite cells were used, six of them being connected in series for BT_2 . However, a 9-volt transistor battery may be found more convenient for the latter. The drain on either battery is 1 ma. or less, so essentially shelf life may be expected.

Danger!

Before proceeding further, it should be emphasized that under no circumstances should the

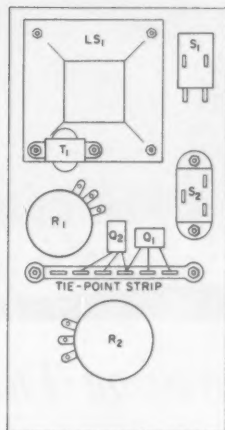


Fig. 2—Sketch showing suggested layout of component on one 3×6 -inch face of a $3 \times 6 \times 2$ -inch aluminum box.

unit be used with meters that are connected in portions of the circuit that are at potentials of more than a few volts to ground. The meters in most manufactured transmitters meet this requirement, but there are exceptions, and no attempt should be made to use the unit without first referring to the circuit diagram of your particular transmitter. Also, make sure that no revision of the original metering circuit has been made. Of course, the metering system of any home-made transmitter should be examined carefully to make certain that the meter is at a point of low voltage to ground in all positions of the meter switch.

Adjustment and Calibration

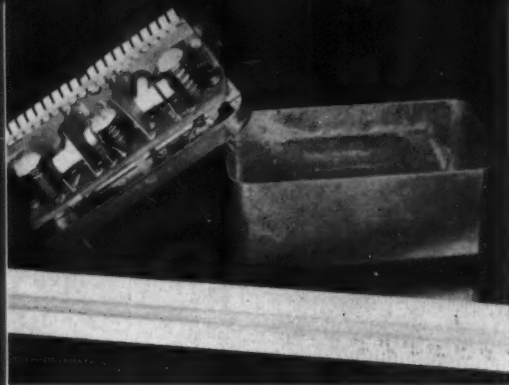
Before connecting the meter leads to the transmitter or other device, turn S_2 to the meter position and short the meter wires. Then change the value of C_3 , if necessary (and the value of C_4 too if used), to bring the oscillator frequency to a tone of a few hundred cycles. Then, with the meter cable connected to the transmitter, the tone should rise to 2000 or 3000 cycles when the meter is reading full scale.

Other Uses

A standard 1000-ohms-per-volt v.o.m. can be read accurately on voltage and current ranges by connecting the leads of the reader directly to the meter terminals. Calibrator R_1 may have to be readjusted to match the comparator dial, since the meter may have a different internal resistance than the one in the transmitter. Resistance values may also be checked but with less accuracy, since in this use, the meter usually reads backwards and the scale is not linear.

The unit cannot be used with a 20,000-ohms-per-volt v.o.m. since the input resistance of the reader is not sufficiently high to avoid a significant shunting effect across the 50- μ s. meter.

(Continued on page 148)



A v.h.f. filter using compression-tuned coils. The nylon tuning screws thread into the insulating material of a printed circuit board. In this case the screws were turned out on a lathe, but they could just as well be made by tapping a piece of polystyrene, screwing it onto a threaded rod and cementing it in place.

How to Squeeze a Coil with a Screwdriver

BY MAYER SAVETMAN*

Compression Tuning in the V.H.F. Range

Most every v.h.f. man knows about squeezing and stretching coils to vary their inductance. This method of tuning keeps the losses low, but it's a nuisance and you're never sure the circuit is still "on the nose" when all shields and chassis covers are in place. The scheme described here gives a fine adjustment even when the coil is inside a box and the power is on.

EVERY radio amateur, experimenter, and technician at one time or another needs high-quality coils for use in resonant circuits, transformers, discriminators, or filters in the very-high-frequency range. Although both fixed and permeability-tuned inductors can be obtained through radio supply houses, these may not have a sufficiently high Q .

The best coil obtainable for the v.h.f. range is the simplest and least expensive—the air-core solenoid. At frequencies from 30 to 300 megacycles the quality factors of such coils are

high, and it is not unusual to obtain a Q greater than 200. The coil should be wound on a cylindrical form with heavy wire (No. 17 or better). The coil can then be removed from the winding form since it is rigid enough to support itself. Coils wound with heavy wire have greater Q than those wound with small wire. Also, coils wound with a large diameter have a greater Q than coils wound with a small diameter.

The inductance of a solenoid is directly proportional to its cross-sectional area and to the square of the number of turns. Inductance is also more or less (depending on the relative length and diameter) inversely proportional to length. An easy way to vary the inductance of a coil is to alter its length by squeezing or stretching it. As the length is increased the inductance decreases, and as the length is decreased the inductance increases.

The squeezing operation may be done mechanically by placing a screw through the coil and a nut on the end of the screw. Both the screw and the nut should be of a dielectric material such as nylon or polystyrene. Although nylon hardware can be obtained, it is easier and cheaper to make your own hardware from polystyrene rods and sheets readily available from radio supply houses. Polystyrene rods can be threaded by holding

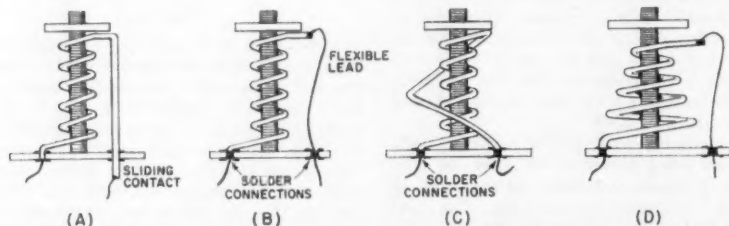


Fig. 1—(A), (B) and (C) show three ways of making connections to a compression-tuned coil. In (A) the lead from the moving end passes through a sliding contact in the insulating base. In (B) a flexible lead connects the coil with an eyelet in the base. Method (C) requires no sliding contact or flexible lead; the wire from the moving end is simply bent so as to flex with the coil. (D) shows a conical-shaped coil which flattens when compressed. In all cases, the threaded rod can be cemented to the bottom plate and the top nut used for tuning, or the "nut" can be cemented to the rod and slotted to take a screw-driver blade.

them in a vise and carefully screwing on a suitable die. A $\frac{1}{8}$ -inch diameter rod threaded with a 6-32 die works well with small coils, and $\frac{1}{4}$ inch rod is recommended for larger ones. Nuts can be made by tapping a hole through polystyrene sheet. In mounting the compression screw on the coil base, it is good practice to tap the base to accept the compression screw and to cement the threads as well to prevent turning. Alternatively, the "nut" can be cemented to the rod and used as a screw head.

Fig. 1 shows three possible mounting arrangements. One end of the coil should be soldered to an eyelet in the base. The other end can slide through a contact in the base or be bent to form a sort of toggle joint, or a flexible lead can be used. The nut is turned, squeezing the coil and thereby adjusting it to the desired inductance. A fixed capacitance connected across the coil will constitute an adjustable resonant circuit. The resonant frequency can be measured with a grid-dip meter.

Air coils other than solenoids can be used. For example, the conical-shaped coil of Fig. 1D flattens to a pancake when adjusted.

If a spring-type wire is used instead of soft copper wire, the coils will return to their original shape as the adjusting screw is loosened. Variable coils made of beryllium copper wire can be tuned many times without permanently deforming and can replace the greatest dust catcher of all, the variable capacitor. The price of this variable inductor is small compared to the capacitor, and because the inductance can be varied over a wide range, the band of frequencies covered by tuning the inductor is also wide.

Tuned transformers can be constructed as shown in Fig. 2. Two coils are used and they can be adjusted for required inductance and for required coupling. Tighter coupling is achieved by moving the coils closer to each other. The coupling governs the band width, and as the coils are moved closer the band width increases. As an illustration of typical values which can readily be obtained, a model was built and coupling was measured on a Q meter. The values of

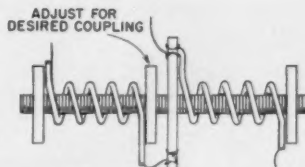


Fig. 2—A transformer with adjustable tuning and coupling using the compression principle. The nut just to the left of the central mounting plate sets the coil separation, and the end nuts are used for tuning.

coupling obtained were 5 per cent for a coil separation of about $\frac{1}{2}$ inch and 10 per cent for a coil separation of $\frac{1}{4}$ inch.

The solenoid is also suited for use in filters in the v.h.f. range. Design formulas for low-pass, high-pass, band-pass, and band-reject filters are given in many electrical engineering texts and in reference books. The advantage of using the air-core coil in filters is that high-Q resonant circuits mean sharper cutoffs and steeper attenuation curves. Also, these coils may be adjusted so that the circuits resonate at the proper frequency, and there is no need for more expensive tunable capacitors. One must be careful in the physical layout of the filter. The coils should not be too close to each other or undesired coupling will result. This coupling would mean less attenuation in the stop band. Adjacent coils should be placed at right angles to minimize coupling. At v.h.f., short lead lengths and good grounds are a must.

At the Electronics Division of Westinghouse Electric Corporation, filters for some applications were designed and built with these adjustable solenoid coils. It was found that they are stable and hold their inductance extremely well under tough environmental conditions, passing shock and vibration tests with flying colors. The photograph shows a v.h.f. filter with five tuned circuits. No tunable capacitors are used.

The experimenter will no doubt find more applications for adjustable air-core inductors. He and his equipment will become more flexible by using them.

QST

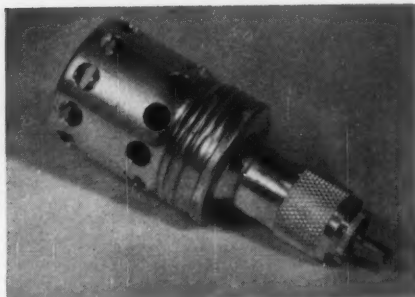
Strays

All amateurs who are members of the Naval Reserve are invited to participate in the Individual National Naval Reserve Radio Network (INRRN) which meets each Friday night at 0100 GMT on 7375 kc. Net control is NCR, operating from the QTH of old NAA in Arlington. Using the general call NCX, NCR first sends general broadcast traffic to all hands (sometimes mentioning surplus electronic gear which is available in the Individual Craftsman Training program). Then, individual stations are invited to report in on c.w. What call sign should you use? It's simple. If you are a W, replace that prefix with NA; if you're a K, replace that with

NB; WA becomes NC; KN become NK; and WV becomes ND. For example, W1HZE would sign NA1HZE; KN1MJA would sign NK1MJA; WA2DIJ would sign NC2DIJ. Please note that these call signs are authorized for use only on this particular net.

If your procedure is rusty, don't worry about it. A couple of nights listening to one of the crack operators at NCR and you'll be right back in the swing of things. Come up on 7375 and meet a bunch of your Navy ham buddies.

Boss man on the net is Capt. Jim McCoy, USNR, W4OI, who has been around the Navy and ham radio for a long time.



The dummy antenna is enclosed in a 35-mm. film can mounted on a coax connector. The nine 1-watt resistors are soldered to copper disks with practically all of the wire leads eliminated.

A Dummy Load off the Mind

BY JOHN HOWARD,* K8MME

PRACTICALLY the same day that March *QST* arrived, the writer had been searching handbooks for verification of procedure for making a dummy load. The cover and accompanying article were a real surprise.

To absorb the transmitter's 7-watt output, EPT's configuration of nine 470-ohm resistors¹ was selected. The soft, foil-like flashing copper happened to be little more than arm's reach away and proved an ideal support. (For those who will follow suit and build similar loads: Be sure to burnish both sides of the copper disks and tin fully before assembling and soldering.)

To add a personal touch, there had to be some "modification." A trim little screw-top aluminum

can that is used to package a 35-mm. film cartridge was adopted as a housing for the dummy. A pattern of 1/4-inch diameter holes was drilled through the side and end. A hole was made in the screw cap to receive a coax reducer bushing, which threads into the coax fitting, making a very rigid mechanical joint. The housing serves as a flue to increase the flow of air when the dummy load is operated in its vertical position, as well as giving protection to the assembly of resistors inside.

The s.w.r. was practically 1:1—almost as good as the antenna itself. After running the dummy for five consecutive periods of two minutes each while checking s.w.r. at different frequencies, it didn't go up in smoke. Resistance still checked out O.K. on a meter.

Thanks, EPT, for getting us away from the habit of snatching those light bulbs!

QST

* Apartment C-107, 1336 Brookline Road, Cleveland Heights 21, Ohio.

¹ Tilton, "V.H.F. Dummy Loads," *QST*, March, 1960.



October 1935

... The editorial 25 years ago extended a welcome to the new Southwestern Division which elected its first director that fall and became a full-fledged ARRL division on January 1, 1936 ... and in the next breath, the editorial congratulated the League itself on its 21st birthday, reached in 1935.

... The issue served up a technical smorgasbord that included articles on Mt. Whitney's 56 Mc. QSOs ... improved equipment on the Arctic-sailing schooner *Morrissey* ... a discussion on circuits in an oscillator-amplifier transmitter ... reducing QRM on 56 Mc. ... a new portable for 56 Mc. ... a multi-purpose test circuit ... and a self-powered v.t. voltmeter. ... There were four pages of hints for the experimenter.

... There's nothing new about s.s.b. — *QST* 25 years ago carried an article by James J. Lamb on background for s.s.b. phone — a simple explanation of modulation and detection principles from a non-mathematical angle.

... *QST* announced League endorsement of a revised R-S-T table, reporting strength on a nine-point scale rather than the five-point one originally given. The revised scale came from W2BSR, who suggested the original system. W2BSR's second suggestion that the letters R-S-T be dropped and reports limited to numbers only was also cheered by ARRL.

... On the light side, W6KBY reported a pair of sixes working in a San Francisco store with the calls GIN and FIZ. ... and this quote from a junior op, who said, no, he hadn't cut his hand. "I picked up a pretty bug in the garden this morning and one end of him wasn't insulated." **QST**

Fig. 1—Control panel at W9ERU. At the left, from top to bottom, are switches referred to in the text as S_5 , S_1 and S_3 . In similar order at the right-hand end are S_6 , S_2 and S_1 . The other controls either side of the Micromatch and RME clipper-filter include remote-speaker switch, drive attenuator and a timer switch. The latter are not directly associated with the switching system.



Easily Constructed Units for Antenna and Equipment Control

Switching Coaxial Feed Lines

BY GENE HUBBELL,* W9ERU

The author does not anticipate that many will want to duplicate his system of control switching. However, the basic idea of making up individual switching units to perform desired special functions is well worth attention.

ANTENNA switching, to make a variety of antennas readily available, has always been of great interest to the author. Even before the arrival of solid-dielectric cable, various arrangements of relays and remote-controlled

* Box 273, R.R. 4, Rockford, Illinois.

motor-driven switches were used at W9ERU. With coaxial feed system, radio-frequency power can be handled almost as easily as d.c. If the reader will refer to the photograph of Fig. 1 and the diagram of Fig. 2, the following description will give some idea of the possibilities.

Circuits

The s.p.d.t. switch S_1 selects either the GSB-100 s.s.b. exciter or the 32V-1 a.m./c.w. exciter, taking the output to S_2 .

S_2 is a three-pole double-throw unit. This switch connects the output of the chosen exciter either directly to the s.w.r. bridge, or inserts a high-power amplifier between the exciter and the s.w.r. bridge. In the "amplifier" position, one

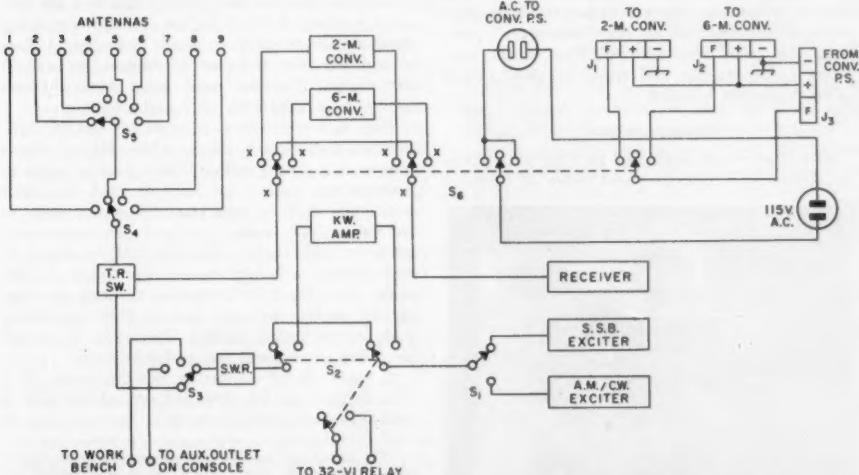


Fig. 2—Wiring diagram of the control panel at W9ERU. All connections between the various units and the switches (power wiring excepted) are made with coax cable terminated in standard coax fittings. The switches are described in the text. J_1 and J_2 , from which plate and filament power for the converters are taken, are 3-terminal female connectors. J_3 , into which the converter power-supply output is fed, is similar but of the male type. The power-supply input plugs into the a.c. outlet.

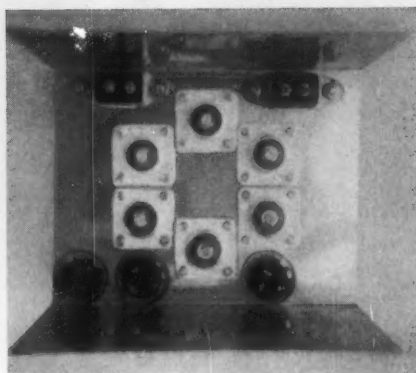


Fig. 3—An interior view showing the layout of connectors associated with S_6 of Fig. 2.

pole operates a relay at the 32V-1 which converts the latter from a self-contained transmitter to an r.f. and audio driver for a high-powered final.

The s.w.r. bridge is connected to one position of single-pole three-position switch S_3 . In the position shown in Fig. 2, the output of either the exciter or amplifier is fed, via the t.r. switch, to the combination of S_4 (single-pole four-position) and S_5 (single-pole six-position) by which it is possible to select any one of 9 different antennas. In the other two positions of S_3 , coax lines running to auxiliary outlets at the work bench and operating console are connected to the antenna switching system so that any temporary transmitter at either of these positions may be fed to the desired antenna.

On the receiving side of the system, S_6 provides for feeding the antenna either directly to the receiver or for inserting a 2- or 6-meter converter ahead of the receiver. In the "converter" positions, two poles of this switch turn on the converter power supply and apply filament power to the converter selected.

Components

Now that we see what can be done with suitable coaxial switches, the next order of business

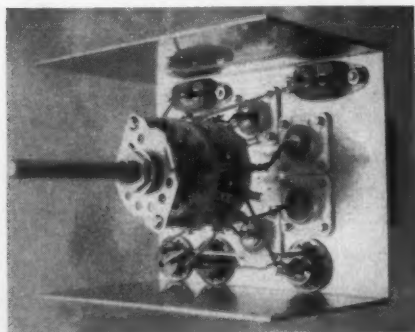


Fig. 4—This view shows how the switch S_6 (Fig. 2) is wired to the connectors before fastening the box cover in place.

is how to build them. All that is required is a small metal box, suitable coaxial jacks, and the right switch assembly. Since the voltages and currents at an impedance level of 50 to 70 ohms are very reasonable (if the s.w.r. is not too high!), we can use small ceramic switches, even for a kilowatt. Such switches are made by Centralab, Erie, Mallory, and others. The parts used in the switches previously outlined are those made by Centralab. The usual coaxial jack designated SO-239 by most companies, or 83-1R by Amphenol, will do the job for the second item, and there are various solutions to the box problem. Premier, Bud and Wyco make small two-piece boxes that are very suitable, and the three-piece box with two flat removable sides will also fill the bill. Tools needed, besides the usual soldering iron or gun, screwdriver, pliers and wire cutters, are drills, files and reamers to make holes varying in size from the small ones required for mounting screws up to the $\frac{5}{8}$ -inch size needed for the SO-239 jacks.

Typical Construction

Let's build one of the coaxial switches previously described—say, S_6 . We need 4 poles, and 3 positions. A Centralab type 2515 will work, with the adjustable stop set for 3 positions instead of the maximum of 5 provided. We will need 6 coaxial jacks to take care of the r.f. input and output connections at points marked "X" in Fig. 2. For the a.c. connections, we will need two chassis-mounting two-contact connectors.¹ For the filament and high-voltage connectors we will use one 3-prong chassis-mounting plug, Amphenol type 86-CP-38, for J_3 , and Amphenol type 78-S38 for J_1 and J_2 . By arranging the above parts on a sheet of paper, we arrive at an approximate size for one face of the box we will need—about 4 by 5 inches. In the remaining direction we must have nearly 3 inches. A Premier PMC-1005 two-part aluminum box will be just right. And we must have some $\frac{1}{4}$ -inch 6-32 screws, 6-32 nuts, wire and solder.

Figs. 3, 4 and 5 show how we lay out the connectors and mount them, while Fig. 5 shows how we wire in the switch. Care must be taken to position the switch carefully so that the shaft and shaft bushing will pass through a hole in the other half of the box and can be secured properly with the nut provided. If we solder 2-inch lengths of No. 16 tinned wire to the SO-239 jacks, then bend them to pass through the lugs on the switch, we can manage this positioning without too much trouble. The other leads can be of any convenient size of hookup wire.

A word about mounting SO-239 jacks. If a $\frac{5}{8}$ -inch hole for the threaded end of the jack is drilled and reamed to size first, the jack can be

¹ The author used two TV power-input connectors (male) and recessed them in the panel. While this reduces the danger of accidental contact with the live connector supplying a.c. to the converter power supply, it does not eliminate it entirely. It would be preferable to use a female connector, such as the Cinch-Jones type S-302-AB. A matching male connector for the connection to the a.c. line is the C-J type P-302-AB. — Ed.

held in this hole while the four mounting holes are located, or even while they are being cut on a drill press. The four mounting holes in the flange of the SO-239 are usually small enough, and the metal soft enough so that a 6-32 screw may be forced to tap its own threads into the jack. This eliminates using nuts to secure the screws, and there is no need to tap these threads with another tool. If an occasional hole in the SO-239 flange is too large for a good fit, a tap or two with a small hammer, while the flange is held on a vise anvil, will close up the soft metal sufficiently. Of course, the four mounting holes in the box, required for each jack, must be drilled large enough to clear the 6-32 machine screws.

Fig. 6 shows a simple double-pole double-throw switch for coax line with an added on-and-off circuit connection for a.c. line-voltage control. A line cord passes through a grommet into the box; one side of the cord terminates at an a.c. receptacle, while the other side of the cord goes by way of a switch contact to the other terminal on the receptacle. The coaxial connections could be used to switch excitation to a linear amplifier or connect the exciter directly to an antenna. In the excitation position the amplifier would be connected to the antenna, while the a.c. switch provision would be useful to turn on the plate power to the amplifier.

Fig. 7 shows a single-pole six-position, remote-controlled motor-driven switch of the type used at S_5 . A small 115-volt a.c. motor drives the switch through a gear train at about one complete revolution in 10 seconds. A switch deck on the switch shaft, outside the box, has a solid disk rotor contact with a small notch in it, making contact at any one time with 5 out of 6 fixed terminals. By applying a control voltage to any of these fixed terminals, the motor is caused to revolve the switch assembly until the notch in the disk rotor reaches this selected terminal when the control voltage is removed and the motor stops. If we have selected the right fixed terminal in relation to the coaxial-switch deck, we have connections properly made on the coaxial lines attached. Centralab makes a switch wafer (type FFD) which can be adapted to this type of motor control. By using a control voltage and a small relay to open and close the a.c. line to the motor, we avoid using expensive well-insulated multiconductor wire, and can go to a low-voltage control. In the case of the switch illustrated, 12 volts d.c. is used for control voltage. Seven wires are needed for a 6-position switch. Solenoid-actuated ratchet-type switches may also be used in similar remote-control applications.

Such standing-wave-ratio checks as have been made on these coaxial switches were carried out with an M. C. Jones Micromatch and a flat 50-ohm dummy load. On frequencies from 3.5 to 29.7 Mc., only a very slight increase in s.w.r.

Fig. 7—The motor-driven switch used at S_5 (Fig. 2).

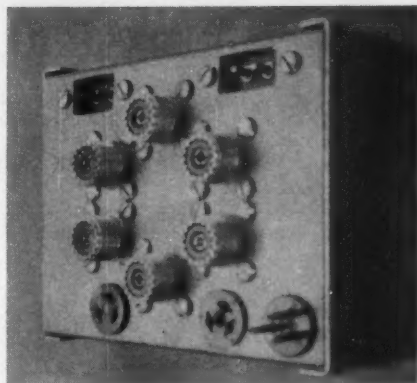


Fig. 5—The completed S_6 (Fig. 2) unit. The output of the converter power supply plugs into the male connector in the lower right-hand corner. Power-supply output for two converters is taken from the two female connectors at the bottom. The a.c. line plugs into one of the connectors at the top, while the power-supply input (115 v.a.c.) is taken from the other which should be a female connector. R.f. connections are made at the coax receptacles.

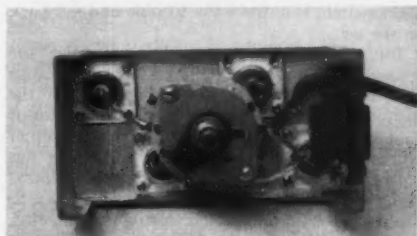
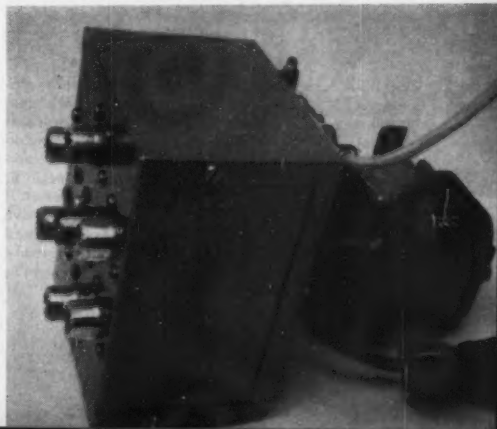


Fig. 6—This is a d.p.d.t. switch for coax with an auxiliary connection for closing an a.c. circuit in one of the two positions.

resulted from the insertion of the switch in the line. Circuit isolation is not quite so good. Signals do feed through from unused antennas to some extent. By tuning in a fairly strong local signal and rotating switch S_4 to a position where the arm does not touch any fixed position, we can get an idea of the isolation provided. On 14 Mc. it looks like about 40 db. on the 75A-4. Signal

(Continued on page 159)



A Foolproof System Well Worth Its Cost

Screen Protection and More

BY JOHN A. EVANS,* W9HRH

WITH the replacement cost of high-power tetrodes at \$40.00 plus each, it is economically important to provide adequate screen protection. Much of the literature contains circuitry using a single relay in the screen supply lead as in Fig. 1. In theory, its operation is very simple and somewhat as follows: When the current through the relay coil reaches the pull-in point as a result of some adverse condition, the armature is expected to transfer the screen voltage to ground via resistor R_2 . If this sequence is followed, things are in fairly good shape as the resistor should draw enough current to hold the contacts closed in the grounded position. Then, with the screen at zero voltage, plate current will drop to a very low level — well under the plate dissipation rating of the tube. You should now have a chance to pull the main switch, run down the trouble and get back on the air.

But suppose you are modulating when the screen circuit opens and the plate current drops to a minimum. This results in no load for the modulator which, of course, is not good, except that the arc-over in the modulation transformer will alert you to the fact that something has happened. By that time it has! Since modulation transformers fall in the same price bracket as a pair of 4-400As, they, too, should be protected.

Relay engineers do not like this circuit anyway. Too much dependence is put on the inertia of the relay armature when the coil is energized.

* % Potter & Brumfield, Princeton, Indiana.

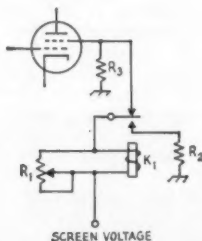


Fig. 1—A screen protective circuit which actually provides very little protection. Shunt resistor R_1 is set so that K_1 will throw if the screen current becomes excessive. If all goes well, the screen voltage will be grounded through R_2 which draws enough current to keep K_1 transferred. Unfortunately, there is no current through K_1 while its arm is moving from one position to the other. If the arm springs back before making contact, all you have is a buzzer! R_3 is a bleeder (about 10,000 ohms) placed at the tube socket. It provides a ground return for the screen and prevents high voltage from developing there when K_1 opens the supply lead.

It should be pointed out that when the movable contact breaks from its normally-closed position *there is no current through the coil*. The movable contact will tend to return to its normally-closed position and repeat the cycle. So you have only very marginal protection, if any — though you will probably have a pretty good buzzer.

The following describes a protection circuit which will take the entire rig off the air within milliseconds in the event of a screen overload. The circuit diagram, Fig. 2, includes a plate-circuit-relay, K_1 , and a variable shunt resistor, R_1 , in the screen supply lead. When the contacts of K_1 close, latching relay K_2 is energized and opens the main plate supply line either directly or through a master control relay. The latch mechanism will hold the relay and the supply line open until a pulse to the reset coil via S_1 returns the circuit to normal. Coil voltage for K_2 can come from a filament transformer or any power circuit that runs continuously.

The relay specified for K_1 is adjusted at the factory to pull in at approximately 9 ma. The shunt, R_1 , is used to vary this pull-in point to a

(Continued on page 150)

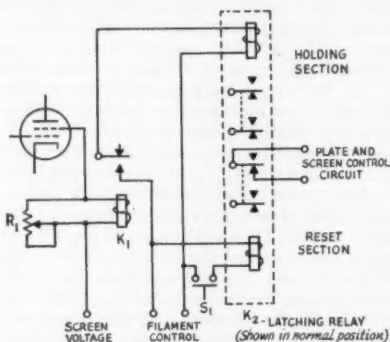


Fig. 2—The recommended circuit. Excessive screen current will operate K_1 , energizing the holding section of K_2 which removes screen and plate voltage from the transmitter. K_2 will remain transferred until S_1 is closed momentarily and a pulse of current through the reset coil returns the contacts to their original position. The screen is returned to ground through the power supply bleeder, but a separate bleeder such as R_3 in Fig. 1 can be added for insurance. K_1 —S.p.d.t. plate circuit relay (Potter & Brumfield LB-5 with 2500-ohm coil).

K_2 —Latching relay (Potter & Brumfield KB17AG and DG series; available with coils for various control voltages, a.c. and d.c.).

R_1 —Sensitivity control for K_1 (see text).

S_1 —S.p.s.t. push-button reset switch, normally open.

The five-band coupler used with the antenna. The L1L2 assembly is toward the rear of the aluminum chassis. L3L4 is in front of it, mounted so the coupling between the two sets of coils is minimized. Pin jacks at the rear are for making connections to open-wire line.

Tunable System for 80 Through 10

Combining a vertical pipe and a horizontal wire, this simple antenna system is useful on five amateur bands. It includes a tuning and matching network that doesn't require switches or plug-in coils.

BY LEWIS G. McCOY,* W1ICP

A Limited-Space Antenna

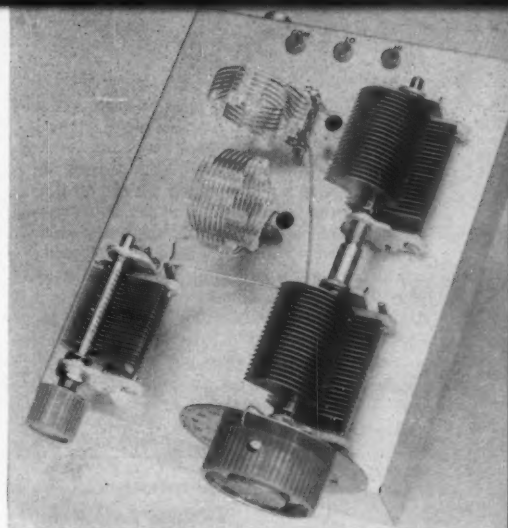
MANY amateurs are restricted in the amount of space they have available for antenna installations, some even being confined to roof-top areas. This poses a problem when 80- and 40-meter operation is planned. The minimum over-all length of a horizontal antenna that should be used, for reasonable efficiency at these frequencies, is about 60 feet. When you must also make allowance for space for guy wires, the average city-lot or apartment dweller quickly runs out of room.

The antenna system described here requires very little space—even the roof of a small house is adequate. The system will provide fairly good multiband coverage—80 through 10 meters—as the test model proved.

What It Is

The antenna is 60 feet long—approximately a 40-meter half wave—center fed. One half of the antenna is vertical, the other half horizontal. Open-wire line is used to feed the antenna, the line being coupled to the transmitter via a multiband antenna coupler. The coupler serves the dual purpose of coupling the transmission line to the antenna and reducing undesired har-

*Technical Assistant, QST.



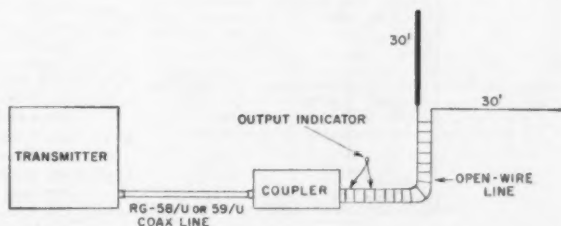
monic energy fed to the antenna. Fig. 1 is a drawing of the entire system.

The vertical portion of the antenna consists of three 10-foot TV mast sections. These mast sections are available from any radio-parts distributor and cost about two dollars per section. Either aluminum or steel sections can be used, although the aluminum is preferred as it is easier to handle. The masts are usually 1 1/4 inches in diameter and have one end swaged so they can be fitted together. Incidentally, with suitable guying these mast sections also make excellent low-cost poles for supporting horizontal antennas.

In addition to the mast sections you'll need about 200 feet of plastic clothes line for guying the vertical portion of the antenna. The actual length required will, of course, depend on the installation but 200 feet is adequate, in any event. The vertical should be guyed about 12 feet from the bottom and a few feet from the top.

If the antenna is to be installed on a roof you'll need three guy anchors. In our test setup three screw-in type clothes-line hooks were used to secure the guys. However, should you decide to mount the vertical in your yard, the guys can be anchored to posts or stakes driven in the ground.

Fig. 1—This drawing shows the set-up of the transmitter and antenna system.



The base of the vertical must be insulated, and a soda bottle works out just fine for this purpose. The diameter of the mast section is large enough to slide over the bottle neck. You'll need some form of base to hold the bottle steady. However, as most of the antenna thrust is in the downward direction, which tends to hold the bottle steady, a block of wood with raised sides, Fig. 2B, will do.

The horizontal portion of the antenna consists of a 30-foot length of antenna wire. One end is wound around the bottle, Fig. 2A, and the other

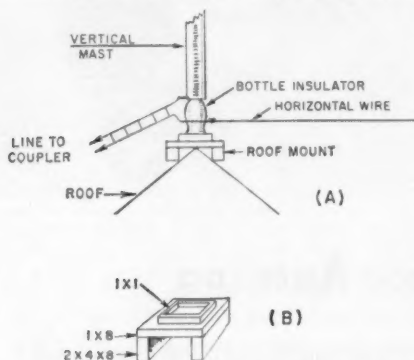


Fig. 2—Details for mounting the antenna are shown at A. At B is one method for constructing a mounting base.

should go to a strain insulator which can be supported by a guy line to any convenient anchorage.

TV open-wire line is used for the transmission line. The length of the line will, of course, depend on your installation. You may find it inconvenient to come through the wall or window of your shack with the open-wire line. If so, you can run the line to the nearest entrance to the shack and secure the line with a stand-off insulator, and then come into the shack with 300-ohm Twin-Lead.

Making the Installation

If you decide to install the vertical in the yard or away from the house it is a good idea to get the base of the antenna at least eight feet above the ground. This will get the feeder high enough so there won't be any danger of decapitating the XYL when she's hanging out the family wash

(also, it should be too high to be used for a clothes line!). A 4 × 4 post 10 feet long should work out well as a mount for the vertical.

Fig. 2 shows one method of making a simple base mount if the antenna is to be mounted on a peaked roof. The mount consists of two eight-inch lengths of 2 × 4 and a piece of one-inch lumber. The width of the one-inch stock will depend on the pitch of the roof. As can be seen in the drawing, the edges of the 2 × 4s rest on the roof slope and the one-inch stock is on the roof peak. When the vertical is mounted in place there is enough downward thrust to keep the block from creeping.

The guys can be attached to the mast by simply drilling holes in the mast, the holes being large enough to pass the plastic clothes line, and tying the line directly to the mast. Lay the vertical on the ground and measure off the length of the guys, which will, of course, depend on the anchor points. Also, drill a hole about 1/2 inch from the bottom of the mast and install a nut and screw. The head of the screw should be mounted inside the pipe with the threaded portion extending out. Use a lock washer and tighten up the nut. When you mount the vertical on the soda bottle it will be a simple matter to fasten one feed wire over the screw, using another nut to hold the end of the line to the vertical.

Before mounting the vertical, put a cork in the soda bottle; otherwise it is likely to fill up with water coming down the pipe. You can, of course, plug up the top of the vertical, but this isn't necessary. Any water coming down the pipe will escape around the bottle.

After the vertical is installed in place and guyed, you can install the horizontal wire. Wrap one end of the wire around the bottle and secure the other end to a guy point, using an insulator at the end of the 30-foot length. If you don't have enough room to stretch out the wire straight, it can be run in an L or U shape. Try to avoid running the wire close to rain gutters or pipes. Also, the wire doesn't have to be horizontal; it can slope downward to a guy point if desired.

One side of the feeder goes to the base of the vertical and the other side to the horizontal wire. Don't worry about the length of line to the shack as it isn't critical. It can be as short as five feet or as long as required to reach the shack. (Well, that seems reasonable! — Ed.)

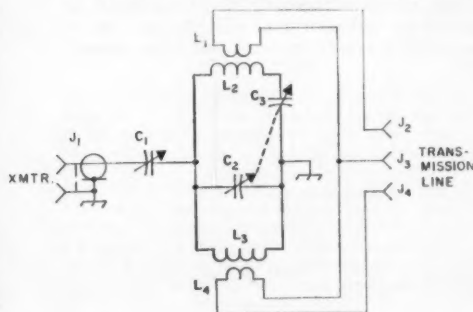


Fig. 3—Circuit diagram of the multiband antenna coupler. C₁—250-μmf. variable capacitor (Hammarlund MC-250-M).

C₂, C₃—325-μmf. variable capacitor (Hammarlund MC-325-M).

J₁—Coax chassis receptable, SO-239.

J₂, J₃, J₄—Tip jacks.

L₁—1.6 μh, 5 turns No. 18, 1 1/4-inch diam., 10 turns per inch, mounted inside L₂ (Illumintronic Air Dux 1010).

L₂—1.1 μh, 5 turns No. 14, 1 3/4-inch diam., 10 turns per inch (Illumintronic Air Dux 1410).

L₃—3.2 μh, 10 turns No. 18, 1 1/4-inch diam., 10 turns per inch, mounted inside L₁ (Illumintronic Air Dux 1010).

L₄—2.1 μh, 6 turns No. 14, 1 3/4-inch diam., 10 turns per inch (Illumintronic Air Dux 1410).

The Antenna Coupler

The antenna coupler circuit shown in Fig. 3 is a multiband type that covers 80 through 10 meters without band switching. Coupling from the transmitter is controlled by C_1 . Two links are provided, L_4 for coupling to the feeder on 80 and 40, and L_1 for 20, 15 and 10.

The coupler is built on a $2 \times 7 \times 9$ -inch aluminum chassis. Arrangement of the components is not particularly critical but it is a good idea to follow the general layout of the unit shown in the photograph. C_1 must be insulated from the chassis, so standoff insulators, $\frac{1}{2} \times 1$ inch (Millen 31001), were used to support the capacitor. Before drilling the holes for mounting C_2 and C_3 , connect them together with a shaft coupler. Set both capacitors at maximum capacitance (plates fully meshed) and tighten up the lock screws on the coupler. With the capacitors coupled together it will be easier to find the correct dimensions for the four screw holes when mounting the capacitors on the chassis.

The four coils are mounted on terminal strips and are supported by their own leads. The three leads from the links to the antenna terminals are run through rubber grommets through the chassis top and back to three tip jacks at the top rear of the chassis.

Adjustment Procedure

It is a good idea to set up the coupler with a dummy load first so you can get the "feel" of the tuning. A 60-watt lamp bulb is good for this purpose with Novice-power transmitters. Connect the screw portion of the base to J_3 and the base tip to J_4 . Use a length of 50- or 70-ohm coax line to connect the coupler to the rig. Set your rig for 80 meters and apply power. First, resonate the final amplifier for a dip. Next, tune C_1 to about mid-range and then adjust C_2C_3 for an indication in the lamp load. Once the bulb lights, readjust C_1 and then C_2C_3 again for maximum brilliance of the lamp. You'll probably have to adjust the transmitter amplifier tuning to keep it in resonance as you make the adjustments. Make a note of the capacitor settings and then proceed to the other bands, using the same method of adjustment. When setting up on 20, 15 and 10, change the antenna lead from J_4 to J_2 . The lead to J_3 doesn't need to be changed.

The same procedure can be followed with the antenna connected to the coupler. The capacitor settings won't be *exactly* the same when you connect the antenna but should be fairly close. However, you will need some type of indicating device to show when the coupler is correctly tuned. If you have an s.w.r. bridge it should be installed in the coax line between the two units. The coupler is then adjusted so that a match is indicated on the coax line.

If you don't have an s.w.r. bridge then you can use a dial lamp as an output indicator. The dial lamp should be connected across a portion of one of the feeders. The method for doing this is shown in Fig. 4. Use two lengths of wire about two feet

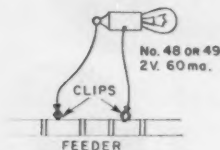


Fig. 4—Dial-lamp output indicator.

long. Clip the leads to one of the feeders, placing the clips about a foot apart. Adjust the coupler so that the dial lamp lights up. Keep one thing in mind in making this adjustment: for any one distance between clips, the brighter the light, the more power there is going up the feeders to the antenna. If the bulb should get too bright, reduce the separation of the clips on the feeder wire. This will reduce the pickup from the line.

This coupler was tested with a rig running 100 watts input. This is also about the maximum power the coupler will handle without the capacitors arcing over from the high r.f. voltages present. Any readers desiring a higher-power version of the coupler can find such a unit described in the 1958 or 1959 editions of the *Handbook* in the chapter on transmission lines.

QST

NEW BOOKS

Guide to Mobile Radio, by Leo G. Sands, published by Gernsback Publications, Inc., 154 West 14th St., New York 11, N. Y. No. 77 in Gernsback Library Series. $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, 160 pages, paper cover. Price, \$2.85.

The "Guide to Mobile Radio" was written to introduce the technician to the field of commercial mobile radio. It contains information on general types of systems, such as industrial, railroad and citizens' radio, paging and dispatching. Also included are data on base station operation, receivers and transmitters, power supplies, antennas systems, remote control and portable equipment, maintenance and licensing. Chapters containing material of interest to radio amateurs include those on portable equipment, power supplies and noise elimination.

TV and Radio Tube Troubles, by Sol Heller. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 224 pages, $5\frac{1}{2}$ by 7 inches, paper cover. Price, \$2.90.

A very high percentage of equipment failure is caused by vacuum tube faults, and this book is intended to help speed up trouble-shooting along with presenting service data on tubes. It should make a handy trouble-shooting manual for the technician or amateur who has had little experience with service work. Although devoted primarily to TV problems, several chapters deal with troubles encountered in radio receivers. The symptoms are dealt with in paragraph form (such as "station drift" and "filament-to-grid coupling") and are followed by suggestions for determining the cause. Information on tube replacements and substitutions is also given.

— E. L. C.

Strays

KØRLV's automobile license number is 8873.



Front view of the two-band station showing how it compares in size with a familiar T-17 mike. The homemade receiver dial is in the center of the panel flanked by the volume control/power switch and the knob which tunes the combined transmitter output and receiver input circuit. Below are the v.f.o. tuning control, the crystal/v.f.o. switch and the band switch with its central zeroing position.

BY S. B. LESLIE,* W5DQV

Two-Band Mobile Station

This little station, complete except for power supply, takes up no more space than many a ham-band converter. W5DQV has built a superbet receiver with crystal filter and an 8-watt a.m. transmitter with v.f.o. into just $\frac{1}{8}$ of a cubic foot. Furthermore, it doesn't even look crowded!

A One-Package Transceiver for 75- and 40-Meter Phone

THIS little rig offers a complete flea-powered station for 75- and 40-meter a.m. phone in a compact $8 \times 8 \times 4\frac{1}{2}$ -inch package. It includes a superhet receiver with crystal filter, a.v.c., noise limiter and speaker, as well as a v.f.o.- or crystal-controlled transmitter with modulator. Power input runs about 8 watts. Results will depend on band conditions and the antenna used, contacts of 10 miles or so being routine. While the rig was intended primarily for local mobile operation, contacts of 135 miles have been made. Installation, mobile or fixed, is simple, the only external attachments being a microphone, antenna and power. For mobile work a flat transistor power supply can be fastened to the rear panel, while for fixed operation any power supply giving the required 250 volts at 110 ma. and 12.6 volts a.c. or d.c. at about 1.6 amp. can be used.

Circuit Information

As shown in the schematic diagram of Fig. 1, a single tuned circuit is used for both transmitter output and receiver input. C_4 and L_5 or L_7 , as selected by band-switch section S_{1B} for 75 or 40 meters, form a conventional parallel-tuned plate tank for V_9 , the 6AQ5 final amplifier. Fixed antenna coupling links L_6 and L_8 , switched by S_{1A} , work well and eliminate the need for a large loading capacitor and its knob. In an arrangement similar to that used in the t.r. switch described by Sabaroff,¹ the grid of mixer V_{1A} , the

pentode sections of a 6USA, is connected to the tank circuit through C_3 . When receiving, the output circuit functions in reverse as an input circuit. When transmitting, the voltage divider formed by C_3 and the input capacitance of V_{1A} , reduces the r.f. output voltage to a value safe for the mixer grid. Peaking C_4 for maximum signal strength on reception also resonates the transmitter final; hence, no tuning or output indicator is needed.

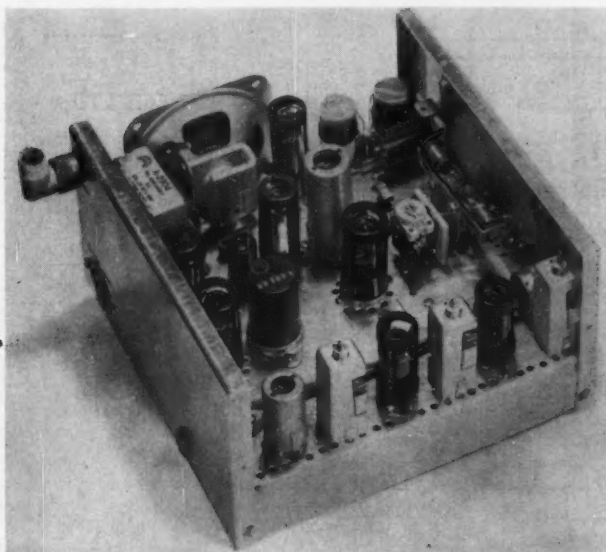
An i.f. of 1650 kc. was chosen for the receiver so that one oscillator range would serve for both 75 and 40 meters. The receiver oscillator, V_{1B} , uses the triode section of the 6USA and tunes from 5450 to 5650 kc. Thus, when C_4 - L_5 is tuned to 75 meters the receiver covers 3800 to 4000 kc., and when C_4 - L_7 is tuned to 40 meters it covers 7100 to 7300 kc.

Following the mixer are the first of three 1650-kc. i.f. transformers and a simple band-pass crystal filter. A.v.c. voltage developed by the detector section of V_4 , a 6AL5, is applied to the grids of V_2 and V_3 , the two 6BJ6 i.f. amplifiers. The other half of the 6AL5 functions as a shunt-type noise limiter. Audio from the detector goes through gain control R_1 to amplifier stage V_{5A} , one section of a 12AU7. The audio output stage, V_6 , uses a 12AQ5 to drive a built-in $3\frac{1}{2}$ -inch speaker through half the primary of a center-tapped output transformer.

When transmitting, the final amplifier plate and screen currents flow through the other half of the output transformer primary, and the same audio system becomes a modulator. V_{5B} , the other half of the 12AU7, provides additional amplification as well as button current for a carbon

* 122 East Third St., Okmulgee, Okla.

¹ Sabaroff, "A Novel Electronic Transmit-Receive Switch," QST, June, 1957.



Top view of the transceiver with cover plate removed. The receiver i.f. strip runs along the rear edge of the chassis from front to back. The rearmost tube is the 6AL5 detector, and ahead of it are the three i.f. transformers and the two 6BJ6 i.f. amplifiers. From left to right across the front panel are the r.f. tuning capacitor, plastic dial and volume control. The receiver tuning capacitor is front and center with its trimmer soldered directly across it. Note how the pilot lamps are mounted on a bracket attached to this capacitor and the wire pointer is soldered to the capacitor shaft. Directly behind the tuning capacitor is the 6U8A mixer-oscillator. To its left is the 12BY7A v.f.o., and behind that is the 0A2 regulator tube. Beside the speaker on the far side of the chassis are the 6AQ5 final amplifier and the 40- and 75-meter coils. Along the back of the chassis are the 12AU7 and 12AQ5 audio stages and the output transformer. The black cans in front of the audio tubes contain the relays, and the crystal socket is just visible between the farther relay and the speaker. On the back panel are the coaxial antenna connector, the power connector (which ought to be a male fitting for safety's sake), and the microphone jack.

microphone connected in its cathode circuit.

The transmitter r.f. section uses a 12BY7A oscillator, V_7 , to drive V_9 , a 6AQ5 final amplifier. S_2 connects the grid of V_7 to either tuned circuit $L_3C_6C_7$ or a crystal socket. The v.f.o. tunes from 3500 to 4000 kc., and crystals in this range can be used for output on both bands. By now you will have noticed that there is no v.f.o. dial or tuning capacitor. A calibrated v.f.o. dial is not needed or even desirable. Such a dial would take up lots of room and would seldom be used since most frequency setting is done by listening to the v.f.o. with the receiver. Therefore, the v.f.o. coil was wound on a slug-tuned form and mounted on the front panel, with a small knob fastened to the end of the slug screw. This makes a neat, efficient tuning system with little backlash. With band switch S_1 in the 75-meter position, the oscillator plate circuit consists of an untuned choke, RFC_2 . On 40 meters, slug-tuned coil L_4 makes a broadly-resonant circuit which does not require any readjustment across the band. The 0A2 regulator tube, V_8 , provides a stable 150-volt supply for the oscillator screen.

Changeover between receive and transmit is controlled by the push-to-talk switch on the microphone. This switch closes the oscillator and final amplifier cathode leads, causing these stages to draw current. Relay K_1 will then transfer

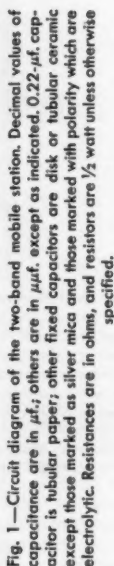
since its coil is in series with the oscillator plate lead. This silences the receiver by removing plate voltage from all stages except the oscillator and by opening one lead to the speaker voice coil.

A central position on the band switch provides for zeroing the v.f.o. In this position S_{1D} removes the short across the coil of K_2 and connects the final amplifier cathode to ground through the coil and grounds the cathode of the v.f.o. S_{1B} shorts the output circuit of the final, and S_{1C} grounds the oscillator plate through C_5 . K_2 will throw and substitute a resistor for the coil of K_1 . Since the contacts of K_1 cannot transfer, the receiver will remain operative, and the v.f.o. signal, greatly attenuated by C_5 , can be picked up.

The tube types used were determined by those on hand. This also accounts for the rather peculiar filament hookup. S_3 , a switch on the volume control, is hooked across two terminals of the power connector. These terminals can be used to control the primary circuit of whatever power supply is used. Incidentally, it would be safer practice to use the male power connector specified in the parts list in place of the receptacle shown in the photos. This would make it impossible to have voltage appearing at exposed terminals.

Construction

The homemade chassis measures $8 \times 8 \times 1\frac{1}{2}$



Careful study of the photographs and captions will reveal the placement of most components.

- C₁—About 15- μ f. variable (Hammarlund HF-35 with all but two rotor plates removed).
 C₂—7.45- μ f. neg. temp. coef. ceramic trimmer (Centralab 822-BN or similar).
 C₃—5- μ f. ceramic.
 C₄—140- μ f. variable (Hammarlund HF-140).
 C₅—0.01- μ f. ceramic.
 C₆, C₇—680- μ f. silver mica.
 L₁, L₂—6-volt pilot lamp.
 J₁—3-conductor mike jack.
 J₂—Coaxial chassis fitting (SO-239).
 J₃—8-pin male chassis connector (Amphenol 86-CP8 with 12-001-03 adapter plate).
 K₁—D.p.d.t. relay, 5000-ohm coil (Potter & Brumfield GB11D with 5000-ohm coil usable).
 K₂—S.p.d.t. relay, 400-ohm coil (Potter & Brumfield RS5D with 335-ohm coil usable).
 L₃—18 turns No. 24 lined, 3/4-inch diam., wound 32 t.p.i. (B & W Miniductor No. 3012) cemented over poly rod.
 L₄—6 turns 8 & W No. 3012 cemented next to ground end of L₃.
 L₅—22 turns No. 22 enam., close-wound on 1/2-inch diam. slug-tuned form (National XR-50).
 L₆—About 25- μ hy., slug-tuned (similar to North Hills 120-E).
 L₇—28 turns No. 24 enam., close-wound on 3/4-inch-diam. poly rod.
 L₈—8 turns No. 24 enam., close-wound on ground end of L₇.
 L₉—18 turns No. 24 enam., close-wound on 3/4-inch diameter poly rod.
 L₁₀—6 turns No. 24 enam., close-wound on ground end of L₉.
 LS₁—3 1/2-inch p.m. speaker.
 R₁—500,000-ohm control, audio taper, with switch.
 RFC₁, RFC₂, RFC₃—2.5-mh. choke (National R-100 or similar).
 S₁—4 poles, 3 positions, 2 sections (Centralab PA-2011).
 S₂—D.p.d.t. toggle.
 S₃—D.p.s.t. switch, part of R₁.
 T₁, T₂—I.f. input transformer (Miller 12-W1). See text.
 T₃—I.f. output transformer (Miller 12-W2). See text.
 T₄—Audio output transformer, primary, 14,000 ohms c.t.; secondary, 3.2 ohms, 5 watts or more (Merit A-2004 or similar).

The relays shown were taken from surplus equipment, but any relays with the required contacts and coil resistance should work as well. The speaker will have to be submounted about 1/2 inch if it is the same size as the original.

The receiver oscillator coil is cemented over a piece of 3/4-inch diameter polystyrene rod which has been drilled and tapped at one end to take a 6-32 mounting screw. The 75- and 40-meter coils are wound on 3/4-inch poly rods 1 1/2 inches long. These coils are secured by passing their ends through small holes in the rod. A layer or two of plastic tape is then wound around the lower end of each coil, and the links are wound on top of this tape.

The i.f. transformers specified are for 1500 kc. and must be altered to hit 1650 kc. This is done by removing the 100- μ f. capacitors that come with the transformers and replacing them with the silver mica capacitors shown in the diagram. The 1648- and 1652-ke. filter crystals are mounted in a dual crystal socket which is

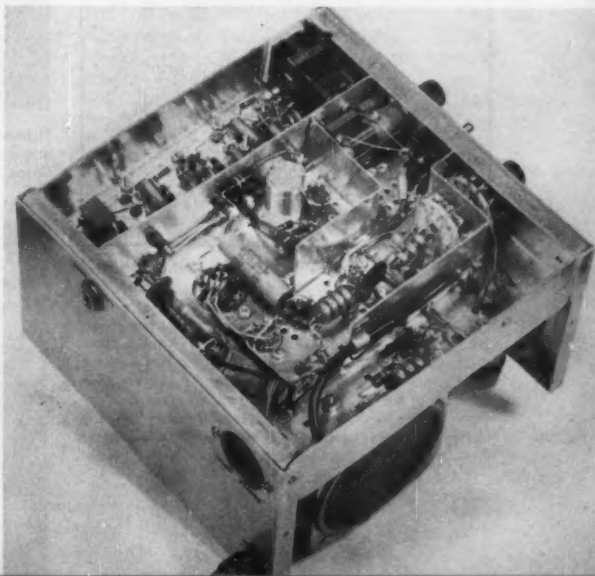
fastened to the i.f. strip shield partition. The socket should be spaced away from the partition so that the contacts are inside the i.f. compartment.

Sharp-eyed readers may notice that the transmitter crystal socket is not wired up to S₂ in the photos. After making provision for crystal control, I found no need of it and did not finish wiring this part of the circuit.

Tune Up and Operation

Before turning on the power recheck all wiring to make sure there are no mistakes. Then apply power and see if all filaments light up and if the proper voltages are present at the various tube sockets. If all seems well, get out the grid-dip meter and check the range of the receiver oscillator which should cover 5450 to 5650 kc. Adjust C₂ until this range is centered on the tuning dial. Now align the i.f. on 1650 kc. You will have to beg or borrow a signal generator to do this properly so that the dial calibration for the two bands

Bottom view. The i.f. strip components are in the shielded compartment along the far side of the chassis, and the filter crystals can be seen in the upper corner. Across the partition from the crystals is the slug-tuned v.f.o. coil, and next to it the v.f.o./crystal switch. Behind them, shielded by another aluminum partition, is the mixer-oscillator compartment in which the oscillator coil can be seen mounted on a polystyrene rod. A third partition separates the front section of the band switch, which handles the r.f. coils and links, from the rear section which switches the oscillator plate circuit. This shield also continues back to isolate the oscillator components on the left from the final amplifier on the right. The piece of coax running through the amplifier compartment connects the band switch with the antenna jack. Toward the rear of the chassis is the relay wiring and the audio circuitry.



will coincide. Tuning C_4L_8 to 75 meters with the band switch in that position should now bring in lots of signals. Switching S_1 and tuning C_4L_7 to 40 meters will start things going on that band. It will be necessary to repeak C_4 occasionally as you tune across the dial. This little receiver will give a good account of itself and is quite adequate for its intended purpose, local mobile work.

Next, check the frequency of the v.f.o. coil, L_3 , with the grid-dip meter. It should tune from 3500 to 4000 kc. with some to spare. Change the v.f.o. coil or capacitors as needed to cover this range. For 40-meter operation, peak the oscillator plate coil, L_4 , on 7250 kc.

Operation is simplicity itself. Just select the desired band, peak C_4 , tune in a signal, repeak C_4 , set the v.f.o. and away you go. You can tell

your approximate frequency by how far the v.f.o. knob projects from the panel. Mine is out about $\frac{3}{4}$ turn for 7200 kc. and about 3 turns for 3800 kc. This will vary from rig to rig so you will have to calibrate yours against the home-station receiver. While frequency setting there will be many strong birdies, but you should have no trouble picking the right one as it is much stronger than the others. With a little practice you can set the v.f.o. any place in either band in just a few seconds. Remember, though, you are depending on received signals to set your frequency, so don't play the band edges too closely.

This little rig does its job well and has about as much XYL appeal as can be expected from a piece of home-brew gear. I hope you get as much enjoyment out of yours as I have mine. **QST**

Strays

Trouble with TVI? Louis Epstein, K9REN, 4708 North Sawyer Ave., Chicago 25, has a list of television receiver manufacturers who will supply high-pass filters. K9REN will send a copy of the list to anyone whose request is accompanied by ten cents and a self-addressed stamped envelope.

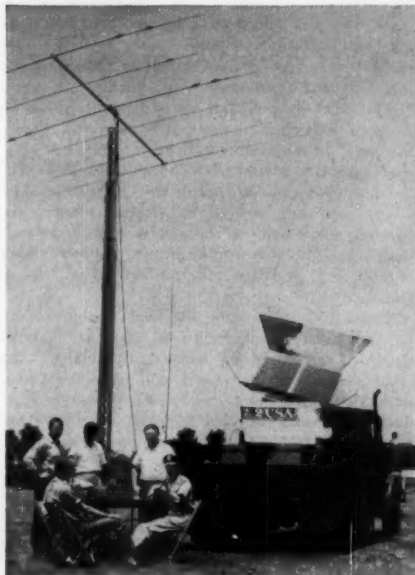
How's your QSL bill? W4LQC/8 suggests that many high school shop teachers are glad to have their students print QSL cards and the cost is only the price of the card stock. He says teachers welcome projects that will be used rather than just serving as "busy work."

Back Copies and Photographs

Back copies of *QST* referred to in this issue are currently available, unless otherwise indicated, from our Circulation Department. Please send cash or check — 50¢ for each copy — with your order; we cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members (*only*) can be furnished at \$1.50 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order — we do not bill nor ship c.o.d.

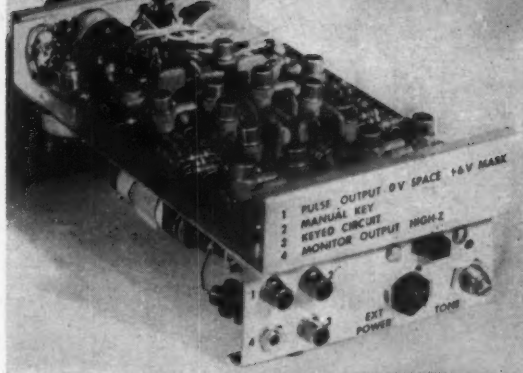
Members of the Pictured Rocks Radio Club of Munising Mich., in photo at right, attended the presentation of an award to 16-year-old Ralph LaCombe (center of group). Ralph climbed through a cellar window to rescue two young boys trapped in a burning home. One was Melvin Meldrum, son of Harold Meldrum, W9ENX. Both youngsters died later despite Ralph's heroic work in carrying them alive out of the Meldrum house. The Michigan hams, in addition to commending Ralph, are raising money and collecting household items for W9ENX, who lost both his son and his home.



Pictured above is K2USA's solar-powered station set up to commemorate the 100th anniversary of the U. S. Signal Corps. The Fort Monmouth group has a special QSL card to confirm contacts.



Rear-end view. Ready-made plug and cable assemblies provide a variety of terminations for the phono jacks J_1 , J_2 and J_3 grouped with the monitor output jack at the left. To the right are the external power connector and monitor tone control below the automatic/manual switch S_2 .



Semiconductor Version of the "Key with a Brain"

BY ALVIN F. KANDA,* K0MHU, ex-KH6OJ

The "Ultimate"—Transistorized

Part 2 of Two Parts

ARMED with information on the basic subcircuits (see September *QST*), let us now dig in and see how these circuits are utilized.

Time Base

The waveforms appearing at the collectors of Q_1 and Q_2 in the time-base generator are shown in Figs. 3A and B. The swings negative are sharper and therefore are selected after differentiation (Figs. 3C and D) for use in triggering the dot and dash generators. The pulses originating from Q_1 are used to start a character and those from Q_2 used to end a character. The spacing between successive "start" and "stop" pulses equals 1 dot length and is variable from about 200 to 20 milliseconds, which figures out to be from 5 to 50 w.p.m. based on 12 dot lengths per letter and 5 letters per word.

Dot Generation

When the keying levers, S_6 , are idle, Q_9 and Q_{10} are "off," with their collectors at the 1 level, driving the gates Q_7 and Q_8 to conduction and thus shorting the ends of R_{15} and R_{16} , which prevents the "start" pulses from triggering the dot and dash generators. The "stop" pulses, however, are connected to both generators, driving Q_4 and Q_6 to the 0 state. Since the base of the keyer Q_{15} is connected to the collectors of Q_4 and Q_6 , Q_{15} is at 1 and the relay is unenergized. When the dot lever is actuated, the collector of Q_9 goes to 0, taking Q_7 out of conduction and thus letting a "start" pulse through to the base of Q_3 , which flips over and actuates the dot generator. The collector of Q_4 goes to 1, driving Q_{15} to conduction and energizing the relay until the succeeding "stop" pulse (1 dot length later) flips the generator back to the idle state. The next start pulse occurs one dot length after the stop pulse when the mark/space trimmers, R_{60} and R_{61} , are adjusted for a unity mark/space, thus assuring the proper intercharacter space.

*201 Clifton Ave., Minneapolis 3, Minnesota.

Dash Generation

Since a dash is 3 times as long as a dot, it can be seen that a "start" pulse and the second "stop" pulse following it can be used to trigger a flip-flop and generate a dash, provided the first "stop" pulse can be suppressed. When the dash lever is actuated, the collector of Q_{10} goes to 0, taking Q_8 out of conduction, thus letting a "start" pulse through to the base of Q_6 , which actuates the dash generator. The collector of Q_6 goes to 1, driving Q_{15} to conduction and energizing the relay. At the same time, the positive voltage swing of the collector of Q_5 going to 0 is coupled by C_9 to the base of the normally 0 Q_4 , thus actuating the dot generator. The collector of Q_4 goes to 1 and adds to the base current of Q_{15} already being furnished by the dash generator. The collector of Q_6 goes to 0, bringing the anode of CR_3 to 0. The first "stop" pulse will then trigger the dot generator to its idle state, but will be shorted out by CR_3 before reaching the dash generator. The combination of R_9 and C_3 delays the rise of the voltage at the anode of CR_3 to assure the shunting of the first "stop" pulse. By the time the second "stop" pulse arrives, the voltage level at the anode of CR_3 is at 1, the diode is nonconducting, and the second "stop" pulse goes "on" to trigger the dash generator "off." CR_3 prevents actuation of the dot generator by the dot lever during the generation of the dash. Without this protection, any dots triggered after the first dash-actuated dot would prevent subsequent "stop" pulses from terminating the dash.

Letter and Word Space

The space of 3 dot lengths between letters is made by leaving the lever in the idle position until one "start" pulse following the end of a letter has gone by, and then selecting the starting character of the next letter. The ideal word spacing of 6 dot lengths cannot be obtained with

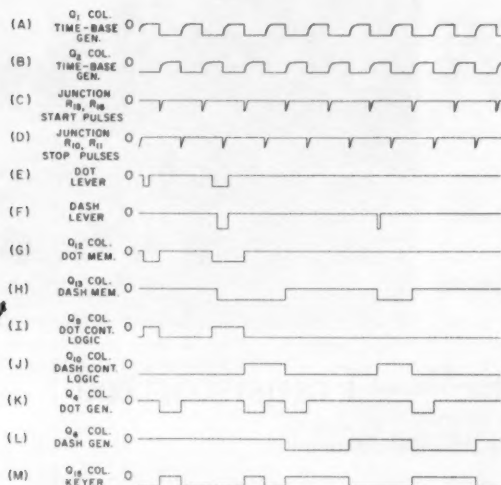


Fig. 3—Waveforms for the word "eat." All forms shown are in reference to common p-n-p emitters, Fig. 1.

this system but spaces of 5 dot lengths or 7 dot lengths are made by letting 2 or 3 "start" pulses go by, respectively. The resulting timing error is about 17 per cent, which is probably better than that obtainable manually.

Memories

The circuit described thus far can be used as a keyer but will not be of the self-initiating variety since if either lever is momentarily actuated in the time interval between two "start" pulses, nothing will happen unless the lever is held until a start pulse passes through the open gate. What is needed is a device to remember this momentary lever actuation, and to hold the gate open until a "start" pulse triggers the desired character. The flip-flop meets these requirements and is used for the dot and dash memories. In the idle state, Q_{12} (Q_{13}) is at 0 and Q_{11} (Q_{14}) at 1. When the dot (dash) lever is actuated, Q_{11} (Q_{14}) is forced to the 0 state and the collector of Q_{12} (Q_{13}) goes to 1, which drives Q_9 (Q_{10}) to conduction if the opposite memory is idle, thus opening gate Q_7 (Q_8). A negative pulse is derived from Q_4 (Q_6) as the dot (dash) starts and applied to the base of Q_{12} (Q_{13}) via diode gate CR_6 (CR_7) to clear or reset the memory to its idle state.

If the opposite memory happens to be on, Q_9 (Q_{10}) is not driven to conduction until the clearance of the opposite memory. If the dot memory happens to be actuated while the dash memory is on, means must be provided to prevent clearance of the dot memory when the dash starts. (Remember that a dot is generated when a dash is generated.) This is done by returning R_{31} to the collector of Q_9 which is at 1 as long as the dash memory is actuated. CR_8 is then reverse-biased and nonconducting when the dash starts, thus preventing the dash from resetting the dot memory. As soon as the dash starts and its memory is reset, the collector of Q_9 goes to 0.

Thus when the dot starts, CR_8 will conduct and the dot memory will be reset. In the reverse situation where the dash memory is actuated while the dot memory is on, the situation of the dot clearing the dash memory does not exist but R_{32} is returned to the collector of Q_{10} to keep the circuit symmetrical. Figs. 3E to 3M show the waveforms observable for the word "eat" at the levers, memories, character generators, keyer, and control-logic circuits.

Character-Control Logic

The dot and dash control-logic circuits, one of which is redrawn in Fig. 4, comprise the "brain" part of the key which does the following:

- 1) Assures that only one gate is open at a time under all conditions.
- 2) When the levers are actuated in rapid succession, the gate associated with the lever actuated first is opened first.
- 3) When a gate is being held open by a memory, actuation of the opposite memory does not open its gate until the generation of the previously-selected character.
- 4) When a gate is being held open by its associated lever with its memory reset, actuation of the opposite memory closes the open gate and opens its associated gate which can be then held open by the lever. Release of either lever will revert the output to the character associated with the still-closed key.

The tables in Fig. 4 define the input signals and summarize all possible input conditions of the control circuit and the resulting output or decision which controls the gate. Note that the 0011 input combination does not occur and that the 1011 combination is undesirable but is sometimes induced if both levers are actuated simultaneously or if the gain of the transistor in the opposite logic circuit is too low.

The outputs of the dot and dash control-logic circuits are not directly connected to their

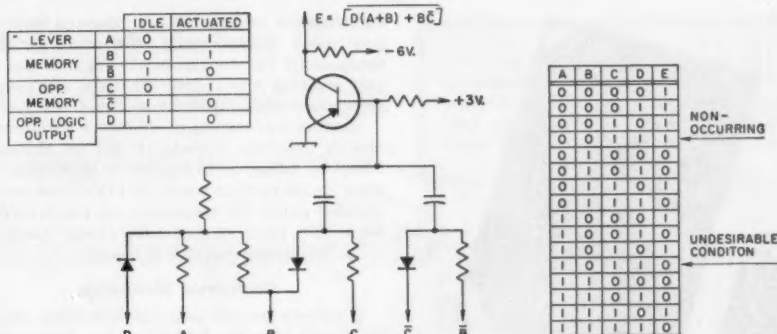


Fig. 4—Operational summary of dot (dash) control logic.

gates but are applied to networks R_{25} - C_{26} and R_{28} - C_{27} , respectively. When a gate is being held open by a memory, the network delays the closure of the gate when the memory is cleared. Without this delay, the memory is cleared and the gate is closed before the character generator is completely triggered by the start pulse and no character is generated.

Monitor

The base of Q_{17} is shorted to its emitter by the normally-closed relay contacts when the key is idle, thus preventing the circuit from oscillating. Whenever the relay is energized for a character, the short is removed and the circuit oscillates.

Construction

Most of the circuitry is contained on two etched-circuit boards as can be seen from the top and bottom views of the key. The smaller $1\frac{1}{4} \times 2\frac{1}{2}$ -inch board holds the monitor, and the $4 \times 5\frac{1}{2}$ -inch board contains the rest of the circuit excluding the relay, switches, controls, batteries, and connectors which are chassis-mounted. The many small parts involved makes the etched-circuit approach very attractive as it solves the mounting and wiring problem simultaneously. The resulting wiring ease and lack of a rat's nest was well worth the extra effort of preparing the circuit master drawing.

The main deck, front and rear panels, and cover are folded from 1/16-inch aluminum. The base plate, which is attached to the cover, is 3/16-inch aluminum to give the unit weight. The chassis slides into the cover-base-plate assembly and is held by screws through the base plate to the bottom lips of the front and rear panels.

Keying Levers

The twin levers S_5 were fabricated from parts obtained from two inexpensive beginner-type straight keys.⁴ Referring to the view showing the lever mechanism, the lever bearings are mounted inside a channel bent out of 1/16-inch aluminum. The front ends of the levers were

⁴ Lafayette Radio catalog No. MS-319, 69 cents each.

sawed off near the contacts, and new Lucite paddles were screwed to what was the rear of the levers, using the threaded holes formerly occupied by the contact space-adjustment screws. These space-adjustment screws are now used as adjustable contacts which are supported on the channel on nylon pin jacks modified by drilling and tapping down their axes to accommodate the 10-32 threads of the screws. The tapped holes in the lever that were used for the tension-adjustment screws were filled to hold smaller-diameter, lighter springs and the tension-adjusting screws were relocated on the channel. The left-over sawed-off shafts of the front panel controls were used as a brace across the open end of the channel and for a common lever stop located behind the lever contacts.

Cost vs. Performance

To save a lot of catalog thumbing and addition, the cost to duplicate this keyer, less circuit boards⁵ and chassis, runs up to about \$74.50 using the following readily-available semiconductors: Q_1 , Q_2 , 2N169 (G.E.); Q_3 - Q_6 , Q_8 , Q_{10} , 2N362 (Ray.); Q_7 , Q_9 , Q_{11} - Q_{15} , 2N363 (Ray.); Q_{16} , Q_{17} , 2N233 (Sylv.); CR_1 - CR_4 , CR_6 - CR_{15} , 1N90; CR_5 , 1N100.

Realizing that cost would probably be the biggest stumbling block for prospective builders, the bargain Lafayette Radio SP-146 was investigated for use in place of the 2N362 and 2N363. Two lots of 13 each were obtained and one unusable transistor was found in each batch. The betas of the remaining transistors as measured in the W2TGP tester⁶ ranged from 16 to 249 with an average of 72. If one is lucky enough to get a 75-per-cent yield (13 good ones out of 17), the savings over the 2N362s and 2N363s would be about \$6.40. Using the "file" of transistors accumulated in the process of developing the circuit, the minimum common emitter d.c. betas for proper operation of the various subcircuits were found to be: dot and dash generators and control logic, 30; dot and dash memories, gates,

⁵ The author will make available the main circuit board with parts-placement diagram for \$3.75 postpaid in U.S.A.

⁶ Priebe, "Checking Transistors," QST, April, 1958.



Etched maze of the monitor and main circuit boards.

and keyer, 20; time-base generator, 75; monitor, 12. Although the dot and dash memories and generators are identical flip-flops, the character generators require higher-gain units because of the less-efficient trigger input circuit containing the series 4700-ohm resistors. The high gain requirement for Q_1 and Q_2 is dictated by personal preference for the high 10-to-1 speed-control range. (The lower speed limit of 5 w.p.m. is useful for checking and demonstrating the functions of the key. For instance, a good demonstration of the memories is to make an *a* or an *n* at 40 w.p.m. and then sit back and hear it come out at 5 w.p.m. A top speed of 40 w.p.m. or better is desirable to present a challenge to the user.

By sacrificing speed-control range, less expensive n-p-n's with lower gains can be used. The 100K value of the speed control, however, will not supply sufficient base current to saturate the transistors at the low speed settings and could be replaced by a lower value for more spread in control. A rough rule of the thumb for the maximum value in kilohms that the speed control should have is $(\beta \times 2.2) \text{ minus } 10$. For instance, if you have a couple of 2N1101s (saving of \$2.48 over 2N169s) with betas of 25, the value of R_{53} should not exceed 45K. The speed-control range is the ratio of the maximum value of R_{59} plus R_{53} to the minimum or R_{53} . The value of 10K for R_{53} is fixed by the choice of R_1 and R_2 , so the speed-control range for transistors with betas of 25 is 55K/10K or 5.5 to 1. The value of C_1 and C_2 in μf . can then be calculated by dividing 145 by the desired maximum speed in w.p.m.

A few more dollars can be saved by substituting fixed resistors for the adjustable R_{60} , R_{61} , and R_{63} after their values have been determined by substitution. The procedure for setting R_{60} and R_{61} is covered in a following section. The value of R_{63} depends on the tone you wish.

In packaging the circuit on etched boards,

subminiature capacitors were chosen to make the job easier. Unfortunately, the prices of these components run comparatively high. If the circuit is being wired conventionally, inexpensive regular-size capacitors may be used.

Another cost-cutting possibility is to eliminate the 13 transistor sockets (\$4.05) on the main board by soldering the transistors in place as was done for the monitor board. But this is not recommended unless the transistors are prechecked to see if they meet, or preferably exceed, the minimum beta requirements mentioned.

Transistor Mounting

If sockets are not used, the transistors should be spaced from the board to allow heat-sinking each lead with a pair of needle-nose pliers while soldering. The monitor 2N233s are soldered in place with the flat sides of their cases glued to the board, thus exposing the leads on the component side of the board for heat sinking. The diodes, incidentally, should also be soldered in place while heat-sinking their leads.

Testing and Adjustment

To trim the mark/space over the speed range requires an oscilloscope. The scope should be internally synchronized and be connected to the pulse output terminals. If the keyer is operating properly, a string of dots (dashes) should be observed when the dot (dash) lever is actuated. With the dot lever closed and the speed control fully clockwise (zero resistance, maximum speed), R_{61} should be adjusted for equal mark and space. Now turn the speed control fully counterclockwise. Unless your scope is direct-coupled, there will be some droop in the waveform, but the length of the pulses should be distinguishable. Adjust R_{60} for equal mark and space. If this is impossible, switch Q_1 and Q_2 or, if you have soldered them in place, rewire R_{60} across the other section of R_{59} and then adjust R_{60} .

The next step is to adjust the relay. Wire a battery in series with a current-limiting resistor and connect the series combination across the keyed-circuit terminals with the scope across the resistor. The voltage and resistance are not critical, the purpose being to get an observable picture of the relay-contact action. With proper adjustment of spring tension and contact spacings, waveforms similar to that obtained at the pulse output terminals should be observed except for a 10-millisecond delay at all speeds. In general, the normally-closed contact adjusts the pull-in current, the normally-open contact the drop-out current, and the spring tension adjusts both pull-in and drop-out currents.⁷

With the relay properly adjusted, the monitor can be used to check to see if the memories and control-logic circuits behave as described in the circuit explanations.

Battery Requirements

The current drain on the 6-volt battery BT_1 should be about 17 ma. with the key idle and

(Continued on page 152)

Design Procedure Plus a High-Performance Unit Using Surplus Crystals

Here's a two-in-one special—enough information on b.f. crystal filters to design one for most any frequency, band width and shape factor, and also a ready-to-build 5.5-Mc. filter for s.s.b. transceiving.

High-Frequency Crystal Filters for S.S.B.

BY D. J. HEALEY,* W3HEC

MANY articles have appeared in *QST* describing crystal filters for s.s.b. operation.¹⁻⁵ However, none of these supplied a design procedure and also gave the precise performance of the resulting filters. This article describes a particular type of filter that was built for a homemade transceiver.

The theoretical shape of the selectivity characteristic attainable with simple crystal filter arrangements was calculated first and found to be inadequate for good sideband suppression. The effect of mismatch when filter sections are cascaded without vacuum-tube isolation improved the steepness of the selectivity characteristic, but at the expense of ripple in the pass band. By inserting a small resistance between two sections of a three-section filter, the ripple was reduced without greatly affecting the shape factor (ratio of the bandwidth at some high attenuation to the bandwidth at low attenuation) of the selectivity curve. A filter constructed according to this design from FT-243 surplus crystals performed as predicted.

In filters such as the one used in the transceiver described by W3TLN⁶ it is not unusual to obtain spurious responses as close as 15 kc. to the pass band which are suppressed by only about 20 db. In the filter described in this article the spurious responses are attenuated more than 50 db. even with a crystal whose principal spurious frequency was only 7 db. down from the main response.

Simple Filter Sections

Fig. 1 shows the equivalent circuit of a crystal neglecting its spurious modes. This circuit has the reactance vs. frequency curve shown in Fig. 2.

*Shawna Road, Cockeysville, Md.

¹Weaver and Brown, "Crystal Lattice Filters for Transmitting and Receiving," *QST*, June and August, 1951.
²Good, "A Crystal Filter for Phone Reception," *QST*, October, 1951.

³Burns, "Sideband Filters Using Crystals," *QST*, November, 1954.

⁴Morrison, "Cascaded Half-Lattice Crystal Filters for Phone and C.W. Reception," *QST*, May, 1954.

⁵Vester, "Surplus-Crystal High-Frequency Filters," *QST*, January, 1959.

⁶Vester, "Mobile S.S.B. Transceiver," *QST*, June, 1959.

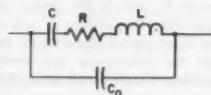


Fig. 1 — Equivalent circuit of a crystal. C and L are the motional capacitance and inductance of the crystal, and R represents the frictional loss. C₀ is the electrode and holder capacitance shunting the crystal.

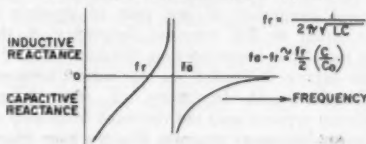


Fig. 2 — Reactance vs. frequency characteristics of a crystal. The series-resonant frequency, f_r , is that of C and L. The anti-(parallel) resonant frequency, f_a , is that of the circuit formed by C and L in one branch and C₀ in the other.

L and C are series resonant at f_r , and f_a is the antiresonant frequency of C₀ and the LC combination. By utilizing crystals in a lattice structure as shown in Fig. 3, a selective filter is obtained. The lattice is a bridge, and it is obvious that maximum unbalance of the bridge will occur when one arm has an impedance which is capacitive while the other arm is inductive. When the impedances are equal, the bridge will

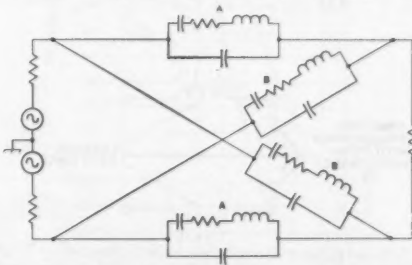


Fig. 3 — Equivalent circuit of a full lattice crystal filter. The series crystals, A, are the same frequency, as are the shunt crystals, B. Note that the lattice could be redrawn as a bridge circuit.

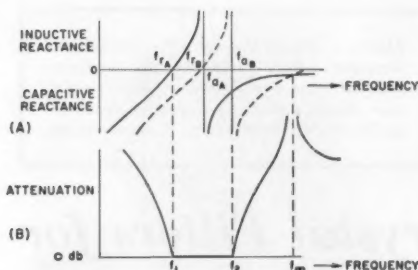


Fig. 4—(A) Reactance characteristics of crystals A and B in the lattice of Fig. 3. In the type of filter described in this article, the series-resonant frequency of the higher-frequency crystal, f_{2B} is made equal to the antiresonant frequency of the lower-frequency crystal, f_{2A} . (B) Attenuation curve of a filter using the crystals of (A). In the pass band between f_1 and f_2 the series and shunt reactances are opposite, the bridge is unbalanced, and nearly all of the input signal appears at the output. At other frequencies the reactances are similar, and the bridge approaches balance and shows little output.

be balanced. The reactance frequency curves of the crystals can then be used to indicate the regions of the pass band and the stop band. Fig. 4 shows what happens when the antiresonant frequency of one pair of crystals is made equal to the resonant frequency of the other pair. It is observed that the pass band of a simple lattice is limited to the region between the antiresonant frequency of the higher-frequency crystals and the resonant frequency of the lower-frequency crystals. For the case where the reactance curves in the stop band are equal only at zero frequency and infinite frequency, analysis of the circuit shows that the frequency

difference $f_2 - f_1$ corresponds to the bandwidth at which the attenuation is approximately 7 db.

The resistive component of the crystal may be transformed to an equivalent parallel resistance shunting the crystal which is essentially constant for the small frequency range of concern. If all crystals have the same Q and inductance, then the equivalent resistance shunting the crystals is the same, and if one considers the resistive bridge thus formed, it is balanced under these conditions. The loss resistance can then be neglected except as it modifies the termination of the filter and affects insertion loss. The point is that the filter behaves essentially as though its elements had infinite Q .

Identical results can be obtained with half as many crystals in a half-lattice circuit. As shown in Fig. 5, this is the equivalent of a full lattice in which the impedances of the elements are one half those of the half lattice. The basic circuit, Fig. 5B, shows two crystals and an ideal transformer having unity coupling. A practical transformer which does not have unity coupling can be represented by the circuit of Fig. 5C. Leakage reactance appears in series with the crystals of the lattice and will lower their resonant frequencies. In narrow-band filters, this can be prevented by connecting a capacitor which resonates with the leakage inductance at the center frequency of the filter in series with the center tap⁷ as in Fig. 5D. This allows a simple center-tapped coil to be used for the ideal transformer.

Designing An S.S.B. Filter

In building a filter for a transceiver, an intermediate frequency of 5500 kc. was selected. This choice is satisfactory for 100-db. suppression.

⁷ Kosowsky, Patent No. 2,913,682.

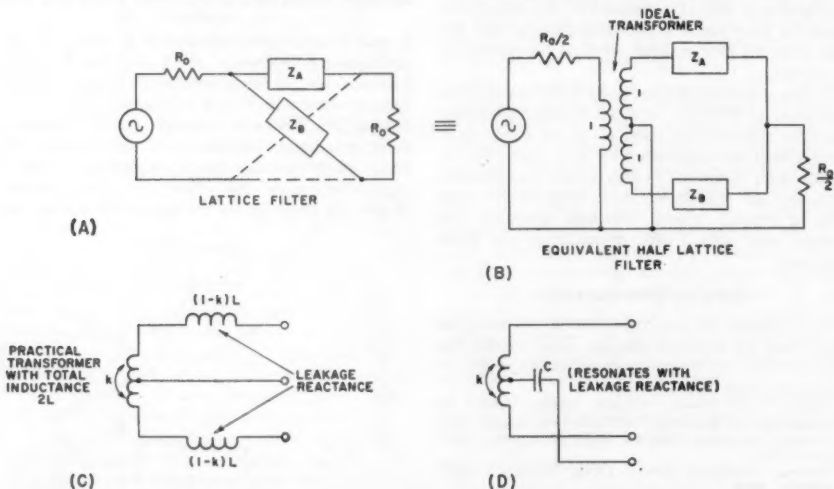


Fig. 5—(A) Basic circuit of a lattice filter and (B) an equivalent half-lattice filter. The transformer is an ideal one with unity coupling between windings. (C) Diagram of a practical transformer showing the leakage inductance which results from a coupling coefficient, k , less than unity. (D) How the leakage reactance may be tuned out by inserting capacitor, C , in the center-tap lead.

sion of spurious signals in the receiver except on 15 meters. There a 5th-order intermodulation product falls in the pass band so that with a simple mixer the spurious response is only attenuated 75 db. However, by using a simple balanced mixer, the desired suppression of 100 db. is realized. The balanced mixer also reduces the preselection requirements on other bands.

Since the pass band is on the order of twice $f_a - f_r$, this frequency difference must be about 1500 c.p.s. for a filter capable of passing the voice frequencies. The second formula in Fig. 2 shows that $f_a - f_r$ depends on the ratio of the capacitance shunting the crystal to the motional capacitance of the crystal. For AT-cut crystals (the ones you get for \$2.95), this ratio is about 250 minimum. Therefore, AT-cut crystals above 750 kc. meet the requirements, and capacitive terminations are feasible. For example, the shunt capacitance, C_o , of a typical AT-cut crystal is about 3 $\mu\mu\text{f}$. If it is desired to terminate a half-lattice filter with a circuit capacitance of, say, 15 $\mu\mu\text{f}$, this will reflect as a total shunt C of $15/2 + 3 = 10.5 \mu\mu\text{f}$. across each crystal. Under such conditions, AT-cut crystals can be used for amateur s.s.b. applications at any frequency above 2625 kc.

Surplus FT-243 crystals (BT-cut) are available for 5500 kc., and their use is economically attractive. BT-cut crystals, however, have C_o/C ratios around 4000 minimum, which is too high to allow the desired pass band to be obtained. The pass band can be widened by paralleling inductance with the crystals. This will raise their antiresonant frequencies and leave their resonant frequencies unchanged. One must be cautious in doing this since the inductance will also be antiresonant with the total effective capacitance of the crystal at some lower frequency, f_∞ in Fig. 6. If this new frequency of infinite at-

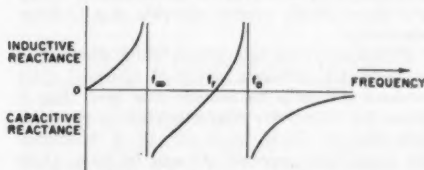


Fig. 6 — Reactance vs. frequency characteristics of a crystal and inductance, L_o , in parallel. f_r , the resonant frequency of C and L , the motional capacitance and inductance of the crystal, is the same as in Fig. 2. f_∞ , however, is higher than the antiresonant frequency of the crystal alone, since L_o decreases the effective inductance across shunt capacitance C_o at frequencies above f_r . L_o is also antiresonant with the total effective capacitance of the crystal at some lower frequency, f_∞ .

tenuation is too close to the center frequency of the filter, the pass-band characteristics may be distorted.

Measurements made on an FT-243 crystal resonant at 5502.195 kc. showed a motional capacitance, C , of 0.0038 $\mu\mu\text{f}$. and a shunt capacitance, C_o , of 14.7 $\mu\mu\text{f}$. The spacing between the resonant and antiresonant frequencies is

therefore $\frac{5502195}{2} \left(\frac{0.0038}{14.7} \right)$ or 711 c.p.s. To

provide a desired spacing of, say, 1422 c.p.s., the effective shunt capacitance must be reduced to one half the value of C_o . This would require the addition of a negative capacitance of $14.7/2 = 7.35 \mu\mu\text{f}$. If an inductance, L_o , in parallel with capacitance, C_o , is considered, the susceptance of the parallel combination is given by

$$B = 2\pi f \left(C_o - \frac{1}{4\pi^2 f^2 L_o} \right) \\ = 2\pi f C_o \left(1 - \frac{f_\infty^2}{f^2} \right)$$

where f_∞ is the antiresonant frequency of L_o and C_o . (The capacitive contribution of the motional capacitance and inductance below their resonant frequency is small enough to be neglected.) For the case above, it is desired to reduce the susceptance of C_o alone, $2\pi f C_o$, by a factor of one half. This means that $1 - \frac{f_\infty^2}{f^2}$

must equal $1/2$, so L_o and C_o must be antiresonant at 0.707 times the filter frequency, or about 3889 kc. for the 5500-kc. filter. Higher values of f_∞ will also work as long as they are not too close to the center frequency.

For convenience, the filter was built with input and output coils which resonate with 56 $\mu\mu\text{f}$. plus about 10 $\mu\mu\text{f}$. tube and circuit capacitance. This is equivalent to about 33 $\mu\mu\text{f}$. across each crystal, or a total effective C_o of 47.7 $\mu\mu\text{f}$. Since the effective C_o desired is only 7.35 $\mu\mu\text{f}$.

$1 - \frac{f_\infty^2}{f^2} = 7.35/47.7 = 0.154$, and f_∞ is 0.92

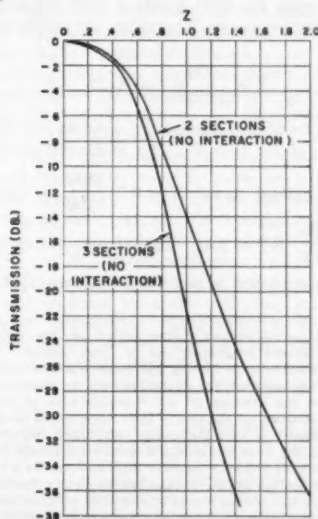


Fig. 7 — Theoretical selectivity characteristics of two and three cascaded identical filter sections when interaction due to mismatch between the sections is ignored. Z is the normalized frequency variable defined in the text. It is proportional to the frequency difference from the center of the pass band.

times the filter frequency, or 5060 kc. This new frequency of infinite attenuation, due to resonance between the coil paralleling the crystal and the total capacitance, is sufficiently removed from the center frequency so that it has negligible effect on the pass-band shape. Design equations for narrow-band capacitor-only filter circuits should therefore be sufficiently accurate for a filter built around FT-243 crystals at 5500 kc.

For narrow-band filters of this type it is convenient to describe the selectivity characteristic in terms of a normalized frequency variable, Z

$$\text{Let } f = f_0 + Z \left(\frac{f_2 - f_1}{2} \right)$$

where f_1 is the resonant frequency of the lower-frequency crystal, f_2 is the antiresonant frequency of the higher-frequency crystal as modified by the circuit, and $f_0 = \frac{1}{2}(f_1 + f_2)$, the center frequency of the filter.

Fig. 7 shows the selectivity characteristics of two- and three-section filters (each section being two crystals in a half lattice) when the effects of mismatch between sections⁸ are neglected. Note that these are normalized curves, plotted in terms of the variable Z . The equations from which these and the other response curves were obtained are given in the Appendix.

If we consider only two sections and a 6-db. bandwidth of 2400 c.p.s., the upper curve of Fig. 7 tells us that $Z = 0.7$ corresponds to 1200 c.p.s. In these plots, Z is proportional to the separation from the center of the pass band. If we assume a low audio cutoff of 300 c.p.s., the carrier must be $1200 + 300 = 1500$ c.p.s. from the center frequency. Therefore, the carrier must lie at

$$Z = \frac{1500}{1200} 0.7 = 0.875.$$

At this frequency the carrier attenuation would only be about 10.5 db. The undesired sideband

would extend from $Z = 0.7 \frac{1800}{1200} = 1.05$ to

$Z = \frac{4200}{1200} 0.7 = 2.45$. The corresponding side-

band suppression would vary between 15.4 and 43.2 db.

⁸ The classical method of filter design uses the notion of a characteristic impedance for a filter section. When several filter sections having the same characteristic impedance are cascaded, the over-all selectivity characteristic should be the product of the characteristics of the individual sections (or the sum of their responses in decibels). The difficulty is that the image impedance required to terminate the filter in its characteristic impedance is not realizable with ordinary resistive terminations. As a result, there is reflection at the termination which is a function of frequency, and the filter section does not provide the correct image impedance for an identical section which may precede it. In practical filters a match is obtained only on the average over the frequency range of interest. The input impedance, therefore, varies from the image impedance value, and it is this variation which causes a practical multisection filter to have a response which is different from that which would be expected from the characteristics of the individual sections.

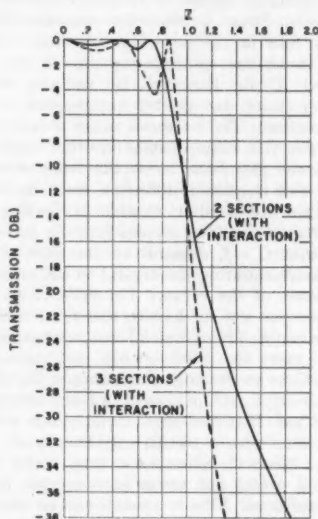


Fig. 8 — Theoretical selectivity characteristics of two and three cascaded identical filter sections when interaction is taken into account. These curves are steeper than those of Fig. 7, but there is considerable ripple in the pass band.

This is not adequate for our purpose, so three sections must be considered. Here, the 6-db. down frequencies correspond to $Z = 0.617$. Carrier rejection would be 11.6 db. and sideband suppression varies between 17.9 and 58.4 db. This still does not meet our requirement, which is 30- to 40-db. suppression of the undesired sideband with a low audio cutoff of 300 c.p.s., and about 20-db. carrier rejection due to filter selectivity.

Fortunately, the interaction which occurs due to mismatch between cascaded identical filter sections will help us achieve this goal. Fig. 8 shows the selectivity characteristics of two- and three-section filters when effects of mismatch are taken into account. As can be seen, these curves are much steeper than those of Fig. 7.

Consider as before a 6-db. bandwidth of 2400 c.p.s. For three sections, 1200 c.p.s. corresponds to $Z = 0.91$, and at the carrier frequency $Z = 0.91 \times \frac{1500}{1200} = 1.138$. At this value of Z , the rejection is 26.5 db. At the low audio end of the undesired sideband, $Z = 0.91 \times \frac{1800}{1200} = 1.36$ and the attenuation is 40.5 db. Thus the three identical crystal filter sections satisfy our requirements.

If we build three sections and reduce the interaction of one section, the attenuation characteristic becomes that shown in Fig. 9. The large pass-band ripple of Fig. 8 is reduced, and by allowing some interaction but not the full

interaction of one section, the pass band can be made nearly flat. In Fig. 9, $Z = 0.8$ when the response is 6 db. down. If we again consider a 2400-c.p.s. bandwidth and 300-c.p.s. audio cut-off, $Z = 0.8 \times 1500/1200 = 1.0$ at the carrier frequency; the corresponding attenuation from Fig. 9 is 19 db. The undesired sideband extends from $Z = 1.2$ to $Z = 2.8$, so sideband attenuation will range from 30.3 to greater than 60 db. Such a filter will meet the requirements as well as provide a flat pass band. The shape factor for 30 db./6 db. is 1.49 and for 60 db./6 db., about 2.5.

Since $Z = 0.8$ 1200 c.p.s. from the center frequency, these values can be substituted into the equation which defined Z . Solving for $f_2 - f_1$ gives a value of $2 \times 1200/0.8$, or 3000 c.p.s. The resonant and effective antiresonant frequencies of each crystal should therefore be separated by half this amount or 1500 c.p.s. The resonant frequencies of the two sets of crystals should also differ by 1500 c.p.s. Table I lists the measured characteristics⁹ of the crystals actually used. Crystals 1-3 are resonant near 5502.2 kc.; crystals 4-6 are near 5503.9 kc., giving a separation of 1700 c.p.s.

The impedance of a filter such as this is given by the expression

$$R_o = \frac{1}{2\pi C_o' f_1 f_2 - f_1^2}$$

C_o' is the shunt capacitance of the crystal plus the reflected circuit and tuning capacitance or about 47.7 $\mu\text{f.}$ as shown earlier. f_1 is the resonant frequency of the lower-frequency crystals, 5502.2 kc. f_2 is the antiresonant frequency of the higher-frequency crystals, which is 5503.9 kc. plus about 1500 c.p.s. or 5505.4 kc. f_o is 5060 kc. as calculated above. Putting these values into the equation gives a value of 3920 ohms for R_o . In a half lattice the termination should be $R_o/2$ or 1960 ohms.

⁹ Shunt capacitance C_o can be found using a Q meter or other standard capacitance-measuring technique. The transmission method described by Vester in *QST* for January, 1950, can be used to get the resonant frequency f_r . It is very difficult to get an accurate measure of f_r with this method because the null tends to be lost in the noise level of the equipment. To get around this, additional capacitance can be added across the crystal, moving the null in toward f_r where there will be more transmission on the high-frequency side. Motional capacitance C can then be calculated from the formula

$$f_r' - f_r = \frac{f_r}{2 C_o + C}$$

where f_r' is the new antiresonant frequency with capacitance C in parallel with the crystal, f_r is the resonant frequency, and C_o is the shunt capacitance of the crystal. The C_o/C ratio is then calculated and substituted into the formula of Fig. 1 to find the $f_o - f_r$ spacing. Actually, in designing filters similar to the ones to be described, it is only necessary to make the relatively simple measurements of f_r and C_o . The C_o/C ratio can be taken as 4000 for FT-243 crystals in the 5500-ke. region.

¹⁰ A simpler expression can actually be used for the filter under consideration. $R_o = \frac{1}{2\pi f_o C_o'}$ where f_o is the center frequency of the filter, and C_o' is the effective capacitance required (7.35 $\mu\text{f.}$ in this case) so that the correct $f_o - f_r$ is exhibited by the crystal.

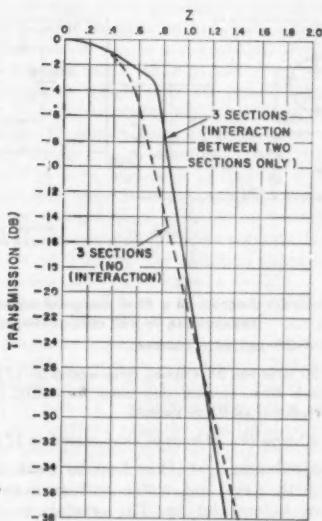


Fig. 9 — The solid curve shows the selectivity of a three-section filter with interaction between two sections only. This design is an excellent compromise between those of Figs. 7 and 8. The dashed curve drawn for comparison is for a three-section filter without interaction.

2000-ohm terminations are used with the filter that was built. Slight variations in the terminations from these values will affect the selectivity only a small amount and can be used to get almost flat pass-band response.

The effective parallel resistance of the coils is about ten times the filter impedance and has negligible effect on the filter characteristics.¹¹

Fig. 10 is a diagram of the complete filter. The first two sections are connected "back to back," and full interaction takes place. The 300-ohm resistor between sections two and three reduces interaction and smooths the pass-band response as shown above. The leakage reactance between the two halves of L_2 and L_3 is tuned out by the capacitors connected in series with the center taps of these coils. L_1 and L_4 , the input and output coils, resonate with the calculated value of terminating capacitance at 5060 kc. and effectively reflect the needed inductance across the crystals. The 2000-ohm resistors complete the termination called for by the design equations.

All the crystals were purchased as 5500-ke. FT-243s and etched to the desired frequencies

¹¹ The input and output coils will have little effect on the impedance of the filter if $2\pi Q_o L$ (or $Q/2 f_o C$) is large compared to $R_o/2$. Q and L are the Q and inductance of the coil, C is the capacitance across the coil, f_o is the center frequency and $R_o/2$ is the terminating resistance. This requirement is usually met in h.f. filters such as the one described. At lower frequencies such as 450 kc., the required $R_o/2$ is higher. Then the terminating resistor must be chosen so that it and the effective resistance of the coil in parallel will give the desired termination.

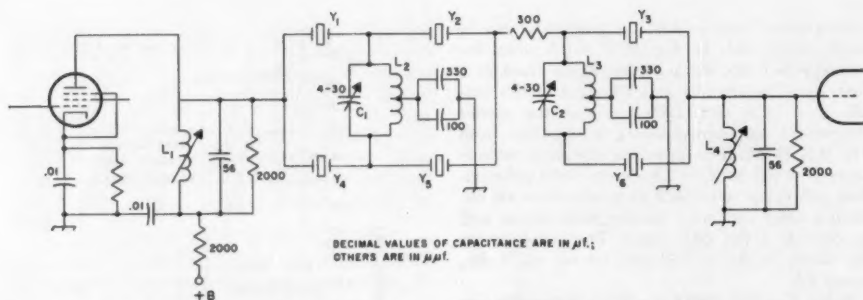


Fig. 10—Circuit diagram of a filter designed according to the methods of this article. Resistances are in ohms, and resistors are $\frac{1}{2}$ -watt composition; capacitors are disk ceramic except as noted.

C_1, C_2 — 4–30- μ mf. mica trimmer.

L_1, L_4 — 50 turns No. 38 enamel, close-wound on 17/64-inch diam. ceramic slug-tuned form (CTC LS-6, National XR-81 or similar).

L_2, L_3 — 60 turns No. 38 enamel, close-wound on 17/64-

with hydrofluoric acid. It is best to wash each crystal with soap and water and measure its frequency before etching. The crystals in each set of three should be as close to each other in frequency as possible, and the separation between the two groups should be about 1500 c.p.s. A simple comparator circuit¹² will allow two crystals to be checked simultaneously and compared, using an oscilloscope and audio oscillator to measure the frequency separation.

Tuning the filter is quite simple since all four adjustments can be peaked for maximum output at a fixed alignment frequency. This frequency should be on the high side of the pass band and can be the carrier frequency used for lower sideband transmission (5505.5 kc. in the case of the filter described). Using the carrier frequency it is only necessary to unbalance the balanced modulator to obtain a c.w. alignment signal. Of course, a signal generator and r.f. probe-equipped v.t.v.m. can also be used. C_1, C_2, L_1 and L_4 are simply adjusted for maximum output.

A slightly better shape factor can be had by detuning the carrier oscillator to a lower alignment frequency corresponding to about the 4-db.-down point on the high-frequency side of the pass band. Fig. 11 shows the measured per-

¹² Clark, "Hints & Kinks," QST, December, 1959.

inch ceramic form (CTC LS-6, National XR-81 or similar with powdered-iron core removed), center tapped.

Y_1, Y_2, Y_3 — All same frequency (near 5500 kc.).

Y_4, Y_5, Y_6 — All same frequency and 1500 to 1700 c.p.s. different from Y_1, Y_2 and Y_3 .

formance of the filter when aligned at 5505.2 kc. The 6-db. bandwidth is 2750 c.p.s., somewhat greater than the 2400-c.p.s. design figure because the average spacing of the crystal pairs used was 1700 c.p.s. instead of 1500 c.p.s. At 30-db. down, the bandwidth is 3950 kc., so the 30 db./6 db.-shape factor is 1.44. This agrees well with the theoretical value of 1.49 from Fig. 9.

The spurious crystal responses occur as indicated in Table I, but the over-all filter exhibited more than 52-db. attenuation at the nearest spurious frequency (5516.800 kc.). The others could not be measured since they were attenuated more than 60 db., which attenuation level was beyond the capability of the measuring setup used.

It should be noted that this filter is better used to pass the lower sideband than the upper one. When aligned at the 5505.5-kc. carrier frequency, the filter provides 20 db. of carrier attenuation with a 6-db. down audio pass band which extends from 300 to 2800 c.p.s. The undesired upper sideband is attenuated more than 40 db. for all audio frequencies above 350 c.p.s.

If the filter is aligned at 5505.2 kc. and the carrier set at 5505.6 kc., carrier suppression is 19 db. for a 6-db. audio pass band of 300–3050 c.p.s. Upper sideband suppression is better than 40 db. for audio above 300 c.p.s.

The cutoff on the low-frequency side of the band is somewhat less steep than on the high side. This is believed to be due to the use of less than ideal coupling coils between the filter sections. Using an alignment frequency of 5505.5 kc. and a carrier frequency of 5502.2 kc., the upper sideband audio

TABLE I

Measured characteristics of the crystals used for the filter described in this article. f_{sa} and f_{sb} are spurious frequencies.

No.	f_c (cps)	C (μ mf.)	C_0 (μ mf.)	f_{sa} (cps)	atten. f_{sa} (db.)	f_{sb} (cps)	atten. f_{sb} (db.)
1	5502195	0.00380	14.7	5516800	9	5559800	12
2	5502227	0.00356	12.3	5519900	13.5	5552000	15.5
3	5502212	0.00290	12.7	1	> 15 ²	1	> 15 ²
4	5503960	0.00334	12.3	5523000	9	5547200	9
5	5503927	0.00348	14.0	5536200	7	5570200	7.5
6	5503860	0.00311	13.8	1	> 20 ²	1	> 20 ²

¹ These frequencies were not recorded.

² Attenuation greater than figures shown.

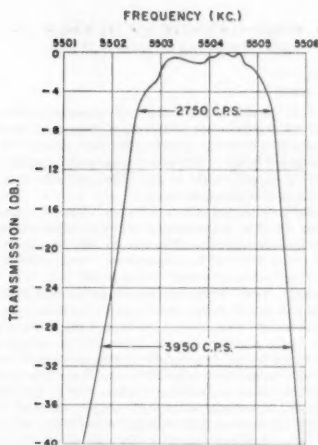


Fig. 11 — Measured selectivity characteristic of the filter described in this article when aligned at 5505.2 kc. The 6-db. bandwidth is 2750 c.p.s., and the 30 db./6 db. shape factor is 1.44.

pass band is 450-2950 c.p.s. for 20-db. carrier suppression. Undesired sideband attenuation is greater than 30 db. for audio above 350 c.p.s. and greater than 40 db. for audio above 750 c.p.s.

When the filter is aligned at 5505.2 kc. and the carrier is placed at 5502.1 kc., the audio pass band is 400-3200 c.p.s. for 20-db. carrier attenuation. Lower sideband suppression will be more than 30 and 40 db. for audio frequencies above 300 and 700 c.p.s., respectively.

Appendix

The selectivity curves presented in this article were plotted from the equations below. All are in terms of the normalized frequency variable Z defined in the text.

The selectivity characteristic of the simple one-section (two crystals in a half lattice) filter is given on page 194 of Herzog.¹³ In decibels this can be written.

$$\text{attenuation (db.)} =$$

$$10 \log_{10} \left[1 + \left\{ \frac{[q_3 \sqrt{q_2^2 - 1} + q_2 \sqrt{q_3^2 - 1}] (S_3 - Z) [Z^2 + (2q_{1u} - 1) Z + 2q_{1u} (q_{1u} - 1)]}{2q_{1u} (Z + q_{1u}) (Z - q_2) (Z - q_3)} \right\}^2 \right]$$

¹³ Herzog, *Siebbaltungen mit Schwingkristallen*, Dietrich Press, 1949.

In this equation the q parameters correspond to the normalized frequencies at which infinite attenuation occurs. q_{1u} is a normalized frequency below the pass band, while q_2 and q_3 correspond to frequencies which may be either below or above. S_3 is a parameter which depends on q_{1u} , q_2 and q_3 . To obtain good rejection away from the pass band, the q s should be large. In particular, if $q_2 = \infty$, and $q_3 = \infty$, then $S_3 = 0$. For the filter under consideration, q_{1u} is the normalized frequency where infinite attenuation occurs due to the inductance used across the crystals. If q_{1u} is also taken as infinite, the equation simplifies to

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4).$$

The attenuation at $Z = -2$ given by this equation is 18.1 db. The attenuation computed from the more complicated expression for the same Z with $q_2 = q_3 = \infty$ and $q_{1u} = 294$ (which corresponds to f_{∞} for the filter described in this article) is also 18.1 db. Thus the effect of the added coils is trivial near the pass-band region.

If we assume that identical filter sections can be cascaded without affecting their basic selectivity characteristics: e.g., sections isolated with vacuum tubes to eliminate interaction due to mismatch, then two sections should produce the following response

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4)^2$$

and three sections should have the characteristic

$$\text{attenuation (db.)} = 10 \log_{10} (1 + 4Z^4)^3.$$

These are the equations which are plotted in Fig. 7.

If an actual circuit employing cascaded identical filter sections is analyzed it is found that the expression for two sections is

$$\text{attenuation (db.)} = 10 \log_{10} [1 + 16Z^4 (2Z^2 - 1)^2]$$

and for three sections

$$\text{attenuation (db.)} = 10 \log_{10} [1 + 4Z^4 (4Z - 1) (4Z^2 - 3)^2]$$

These selectivity characteristics are plotted in Fig. 8.

Three sections with the interaction of one section reduced yield the following characteristic

$$\text{attenuation (db.)} \cong$$

$$10 \log_{10} [1 + 16Z^4 (2Z^2 - 1)^2] + 10 \log_{10} [1 + 4Z^4]$$

This is plotted as Fig. 9.

QST

Straps

Members of the Grace Methodist Church in El Paso, Texas think theirs may be the only church-owned amateur radio station — W5AYV. First graduate of the church radio class was KN5CIH. More youngsters are training. W5AYV is now on Novice bands only and will schedule on any band between 2 and 4 p.m. MST Sundays.

Switchcraft, Inc., noting the suggestion in May QST (page 83) that colored adhesive bandages can be used for identifying various cables and outlets, points out that they have been merchandising for two years a product called "Colored Tape." The tape is specifically designed for identifying different connectors.

● Technical Correspondence

S.S.B. TRANSCEIVER MODIFICATIONS

601 Wallerson Road
Baltimore 28, Md.

Technical Editor, QST:

There are a few changes and additions which have been made to the Mobile S.S.B. Transceiver (June, 1959 QST) over the past year which some of the fellows may be interested in.

Referring to Fig. 2 of the article, the value of the 8- μ f. capacitor connected from the plate (Pin 1) of V_{1A} to ground should be changed to 0.1 μ f. This eliminates a transient noise from the speaker when going from receive to transmit.

Better carrier suppression can be realized by rearranging the wiring of relay K_1 to ground the grid of V_{4A} when in the transmit mode. That is, the one extra contact on K_1 which is not shown connected to anything should be connected to Pin 2 of V_{4A} . There is enough carrier leakage from the V_{4B} side of the tube to make this worthwhile. In my case, the relay armature was connected to ground through the shield on the V_{4A} grid lead. You can optimize this ground connection for your particular layout by pulling the two i.f. tubes, V_2 and V_3 , and empirically determining the connection for minimum stray carrier leak-through.

It wasn't realized at first, but the peak reading a.g.c. circuit for the receiver function also will serve to give a.g.c. action for the transmit mode (this has been dubbed a.l.c. by some of the equipment manufacturers). This was accomplished without adding any more relay contacts. First, the two i.f. tubes were replaced with 6BA6s and a.g.c. was applied to both of these tubes. With this change you get slightly better a.g.c. action on the receiver and set the scene for adding the transmitting a.g.c. You will note that the a.g.c. circuit responds to the peak value of the audio signal applied to it. If we examine the signal appearing at the grid of the Class AB₁ final amplifier we will find an audio signal appears when the input voltage reaches the point which will cause grid current to flow. At this level the grid acts as an envelope detector of the drive signal. This audio signal can be rectified by the a.g.c. circuit in much the same way as the receiver audio, and the resulting d.c. applied to control the gain of V_2 and V_3 . This lowers the transmitting drive to the point where the final is just reaching the grid-current region on voice peaks, allowing you to operate the final at peak efficiency at all times without overdriving it. Circuitwise, all that is required is to

add a 0.1- μ f. capacitor from the "r.f. ground" side of the final tank coil to the input of the a.g.c. circuit, along with a resistor in series with the bias supply. Also, R_4 is now connected to the "REC +300-volt" connection, rather than to the "full time" +300 volts. This removes the a.g.c. delay when in the transmit mode.

The circuit changes are shown in the accompanying figure (Fig. 1). The parts added to the original circuit are all marked with asterisks. The screen resistor for V_2 (R_1 in Fig. 2, June 1959 QST) should now be adjusted to give some a.g.c. action on transmit voice peaks.

You might have some questions as to the adequacy of this a.g.c. since some small grid current must flow in the final to make the circuit operate. I made some measurements using a random-noise generator to simulate the voice, in order to see how much "other sideband" it cost me to operate the final at full efficiency. The rig gave 40-db. suppression with an audio input which drove the final to about 20 db. less than maximum output. It had 37-db. suppression for audio inputs which were 20 db. above that required for maximum power output. In other words, the loss of suppression due to the a.g.c. was so small as to be barely measurable on the 8 meter of my 75A3.

A number of inquiries have been received on the VXO crystal. I loaned the original 30-Mc. crystal to W3BWK to make copies of. These are available now from the Piesco Crystal Company in Carlisle, Pa. Incidentally, I have built an all-band version of the transceiver for use in the home shack and in this rig a different VXO crystal is used on each band. The coverage on all bands is quite satisfactory except for 75 meters, where the total range per crystal is only about 15 to 20 kc. In each case, the VXO crystal was chosen to be 8550 kc. above the band to be covered. These crystals were also obtained from W3BWK—he knows the processing tricks for making a good VXO crystal.

On the FT-243 crystal filter, after making a number of them I have decided that a more reasonable bandwidth to strive for with the cheaper crystals is about 2.1 kc. For this, the spacing between the crystal-pair frequencies should be approximately 1.2 kc. This bandwidth gives better receiver selectivity anyway and the transmitter fidelity is still good. Several fellows have had trouble eliminating the off-frequency (15 kc. to 25 kc.) filter spurious responses with the selection of crystals available to them. One VK has reported that he eliminated these spurious responses in the filter by cascading three half-lattice sections, this giving much lower probability of the spurious responses in one section coinciding with a spurious in both other sections. A W2 reported that fine polishing of the crystals with an optical grinding compound reduced the extraneous crystal responses considerably. Other variations on the filter have appeared in recent issues of QST.

The original mobile rig has been operating in the car for almost three years now with no maintenance or tube replacements, so apparently the design is fairly reliable.

— Ben Vester, W3TLN

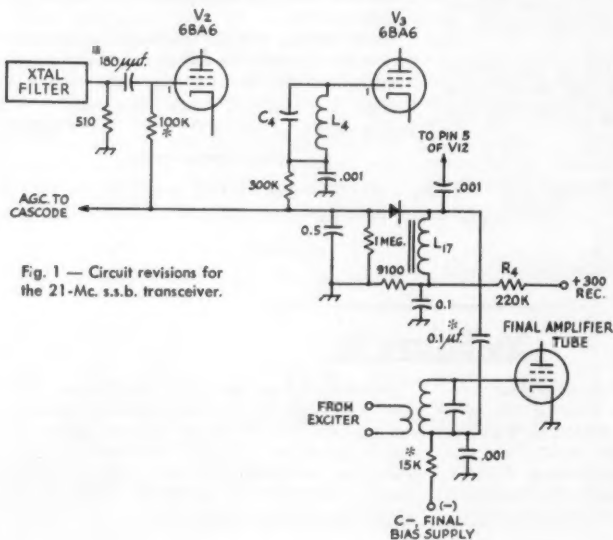


Fig. 1 — Circuit revisions for the 21-Mc. s.s.b. transceiver.

LOW-PASS FILTERS AND SPURIOUS RADIATIONS

Box 266
Setauket, N. Y.

Technical Editor, QST:

Use of a low-pass filter is generally considered good practice even with a transmitter designed to minimize TVI, and if a multiband antenna is used, some form of antenna coupler is usually advisable to keep the s.w.r. in the coax line low for the sake of the filter capacitors. It is fairly generally recognized that the length of coax between the transmitter and the antenna coupler may in some cases play a critical role in the spurious-radiation problem, but the *Handbook* and Grammer's excellent article in February, 1950 QST fail to mention that the low-pass filter itself behaves like a considerable length of line in its pass band. It is enough, in fact, to make a joke of the manufacturer's recommendation that the line be kept short with respect to a quarter wave.

At the operating frequency a properly-adjusted antenna coupler will, of course, terminate the coax so the length is immaterial. The usual series-tuned primary in the coupler will present a large inductive reactance to all harmonics (at least up to the self-resonant frequency of the primary coil), and at subharmonic frequencies the coupler will have a large capacitive reactance. If the transmitter has the usual π -network output, these large reactances will cause no trouble (with a short coax link) since the spurious currents will prefer to flow harmlessly to ground through the low reactance of the output capacitor. But if the coax link is nearly an odd number of quarter waves long, the high reactances presented by the coupler will be transformed into low reactances of the opposite sign at the transmitter output.

This harmonic currents may find a lower impedance to ground through the coax link and antenna system than via the π -net output capacitor, and so be "sucked out" to be radiated. And in the case of "subharmonics" a small inductive reactance reflected to the transmitter may just happen to resonate with the π -net output capacitor. The resulting tank circuit can easily have a high enough Q to make the drop in the π -network coil negligible, so substantially the full subharmonic voltage present at the final plate will appear in the antenna coupler. The subharmonic problem is likely to be particularly troublesome with a transmitter like my Apache with π -network interstage coupling, since the π net is just a low-pass filter.

This problem was brought forcibly to my attention when W2BHD (about 10 miles away in Northport) broke in on a 14-Mc. phone QSO with W4BHG to tell me he had heard me calling "CQ 20" on 7120 kc. It soon developed that the spurious signal was cut way down (by over 20 db.) if I either retuned the antenna coupler to work on the other side of resonance or if I removed the low-pass TVI filter. The antenna was a 40-meter dipole center-fed with 600-ohm line. An apparently permanent cure was to put in additional coax between the filter and coupler to make the effective length, including the filter, a half wave at 7 Mc. and hence an even number of quarter waves on 14, 21 and 28. I did not feel it necessary to go to a half wave on 3.5 Mc. since only the v.f.o. operates on 1.75 Mc. in the Apache, and the antenna would be very ineffective, anyway. Harmonics, if present, would show up as reflected power on the s.w.r. indicator.

In order to use this scheme it is, of course, necessary to know the effective length of the filter. Mine is a Johnson 250-20, which I measured to be 0.168 λ at 7.0 Mc., or the equivalent of 15.5 feet of coax (23.6 feet of open line). I found that the various bits of connecting coax I had used between the π net and the coupler (not forgetting the coax inside the transmitter cabinet to the output capacitor, and that inside the "Monimatch") added up to 13.8 feet. By adding 16.1 feet to the length of lead between the filter and Monimatch I brought the total to a half wave at 7.15 Mc. The extra cable is coiled neatly on the underside of the operating desk top.

Users of other models of filter may be able to obtain data on the electrical length in the pass band from the manufacturer. Otherwise an estimate of the length may be

¹ I.e., energy at a submultiple of the output frequency fed through the final stage from the oscillator or a frequency multiplier.

made. In the case of a filter with n identical sections, with cut-off frequency f_0 megacycles, the effective length would be $206 \frac{n}{f_0}$ feet of coax. Actual filters have m -derived half sections at the ends which introduce an error in this simple formula which may be 15 or 20 per cent high.

I wish to express my appreciation to W2BHD for getting me started on this.

— H. Kuper, K8CU

IS THERE A UNIQUE DESIGN FOR A MAXIMUM-GAIN YAGI?

626 East Main St.
Moorestown, New Jersey

Technical Editor, QST:

A question often asked in antenna work today is, "What is the best design for a Yagi antenna?" Various designs for "maximum-gain" Yagi antennas, most of which seem to work about as well as any other maximum-gain Yagi design, have been offered. This makes one wonder if there is one "best" design.

There has just come to our attention a report of work done at a government laboratory which answers this and a number of other interesting questions.¹ This report, which is devoid of mathematics and is very easy and interesting to read, shows why two or more experimenters can derive different antenna designs and yet obtain something reasonably close to the same gain—in other words, why there is no unique design for a "maximum-gain" Yagi antenna.

A second item of interest in the report was the authors' description of a method of increasing the spacing beyond the usually accepted maximum of 0.25 while still maintaining the maximum possible gain. Third, the report gave information which will simplify the adjustment of multi-element Yagi antennas.

According to the report, there is no unique design which will yield the maximum gain. The gain of a Yagi antenna is a function of the ratio of the phase velocity, v , of the wave along the antenna to the velocity of light, c . The phase velocity in turn is a function of the element length, diameter, and spacing. For any given antenna length, there is a value of the ratio v/c for which the gain will be maximum. It does not matter what combination of element parameters is used to obtain this ratio. It is thus possible for two or more workers to derive different designs with different element parameters, with each design having the v/c required to give maximum gain. This also implies that if one of the element parameters, such as diameter, is changed in a maximum-gain design, then one or more of the remaining parameters, element spacing or length, will also have to be changed to readjust the v/c ratio to its optimum value. Ehrenspeck and Poehler state without presenting experimental evidence that within limits (which are not stated) it is possible to obtain an optimum design with ratios of element diameter to wavelength as high as 0.048, or almost 5 per cent.

We do not wish to imply that it is necessary to measure phase velocity in order to adjust an array, as this is not practical in the field. The phase velocity information is useful in explaining antenna performance and in determining what adjustments should be made to an array.

Wide-Spaced Arrays

As is well known, the antenna gain is a function of its length. It is therefore desirable to make the antenna as long as possible. However, to minimize structural problems it is desirable to use as few elements as possible; this indicates that the spacing between elements should be as wide as possible. As the spacing between the driven element and directors is increased beyond about 0.25 λ the gain of the antenna begins to fall. This is because the coupling between the driven element and the directors decreases, thus reducing the effectiveness of the directors. However, by inserting an additional element approximately 0.1 λ in front of the driven element the authors were able to use spacings up

¹ Ehrenspeck and Poehler, "A New Method for Obtaining Maximum Gain from Yagi Antennas," ASTIA Document No. AD160761, available from the Office of Technical Services, Washington 25, D. C. This paper also was published in the October 1959 issue of the *IRE Transactions on Antennas and Propagation*.

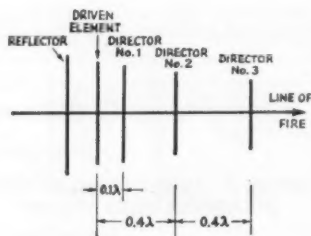


Fig. 2

to 0.4λ and retain high gain. This is shown in the drawing (Fig. 2).

Simplified Adjustment Procedure

Because of the large number of elements, and hence variables, in a high-gain antenna design, the adjustment procedure may become quite involved. The report gives useful information which will simplify the adjusting procedure: Because of the method of operation of the Yagi antenna the directors have no effect on the reflector; thus in setting up an array one may start with just a driven element and reflector, and adjust this combination for maximum gain. Once this adjustment is found it will not be altered by the addition of directors or by their adjustment. This simplifies the adjustment of the antenna by reducing the number of possible combinations of the reflector and director spacing.

Ehrenspeck and Poehler conclude their paper by describing a method for designing a Yagi. We will not present it here since it involves a large number of graphs.

— John J. Nagle, K8PDR

REFLECTION FROM SATELLITES?

354 W. Birch St.
Oxnard, California

Technical Editor, QST:

I have just read the article by Raphael Soifer, K2QBW, in the July, 1960, issue, titled "High Frequency Satellite Scatter." I first became aware of this phenomenon (or a possibly related one — Ed.) while listening to DX in the f.m. broadcast band. Most of my observations were made during the past nine months from a location near the Cal Poly Campus in San Luis Obispo, Calif. Using a good f.m. receiver and a 5/5 antenna with rotator I was able to receive signals from Sacramento (about 200 miles north) to San Diego (about 250 miles south).

When listening to a station just barely discernible in the noise it would suddenly take on a rapid fade (like airplane or mobile v.h.f. flutter) and the signal strength would rise greatly until the signal was extremely strong. After one or two minutes the effect was reversed and the signal faded back to its original level in the noise. The "opening" was several times traced with the beam from Fresno to San Diego and was found to make the trip in about five minutes. I haven't figured it closely but it seems to be too fast to be any plane. I arrived at the conclusion that it must be satellites and more or less forgot about it. More recently I have received short bursts here in Oxnard from KEAR in San Francisco (300 miles airline northwest).

The phenomenon cannot be confused with meteor bursts though it has some resemblance to them. The longest meteor burst I have ever heard on f.m. lasted about two or three seconds but, as Mr. Soifer noted, the satellites give bursts of one or two minutes' duration.

— James R. Kaness, K8HEC

THE CASE FOR NARROW A2

33 Fifth Ave.
New York 3, N. Y.

Technical Editor, QST:

I think 2-meter men are overlooking a very good bet for extending their coverage: the DX potential of A2 emission. Let us analyze what such a signal consists of. Assuming 100

per cent modulation, an m.c.w. signal may be broken down into three separate components: a carrier of, say, 100 watts, transmitting no modulation or information, and two c.w. signals of 25 watts each. These are formed by the sidebands having degenerated, in the case of A2, into two side frequencies, one spot on either side of the carrier assuming a constant-frequency tone. As the tone is keyed, the side frequencies go on and off, using up spectrum space in proportion to the keying speed in bauds. In other words, they have properties identical to c.w. signals. Indeed, they are c.w. signals.

Since they are c.w. signals, the total bandwidth taken up by an m.c.w. signal is equal to $5b + 2f$, where 5 is the constant for signal fading, b the keying rate in bauds and f the frequency of the modulating tone. By comparison, an A1 signal takes up only $5b$ cycles of space. For 20 w.p.m., the c.w. signal takes up about 100 cycles of bandwidth. Wait just a minute! Most of the receivers on the market only go down to 500 cycles as a lower limit on pass band. This is true of the 75A-4, the Hallcrafters and National lines, and most of the Hammarlund line. 500 cycles is the smallest bandwidth the receiver will chop down to. Therefore, and this is important, the total amount of noise the receiver will admit is fixed by the 500-cycle pass band, and any further reduction in the bandwidth of the transmitted signal below 500 cycles can have no effect on the signal-to-noise ratio. This is because the only determining factors on the S/N are the amount of signal present and transmitting information, and the amount of noise present in the pass band. If all the signal components which transmit information can be squeezed into 500 cycles of space, then the S/N will be the same as that produced by a c.w. signal of the same power.

Getting down to cases, 100 watts carrier power of m.c.w. contains 50 watts (the two sidebands) of information, 100 watts of c.w. contains 100 watts of information. A 100-watt rig on m.c.w. produces half as much communications power as a 100-watt rig on c.w. does. If the m.c.w. signal can be squeezed into the 50-cycle "sharp" pass band of the receiver, then it will be lower in S/N than the c.w. signal only by a factor of two, or 3 db. In other words, low-pitched m.c.w. is 3 db. down from c.w. in theoretical advantage. How low in pitch? Well, by applying that $5b + 2f$ formula, we find that, for 20 w.p.m., a tone of 200 cycles will be permissible. For 30 w.p.m., 180 cycles is the highest allowable tone, if we are to keep our pass band within 500 cycles.

Narrow m.c.w. (n.m.c.w.), then, is 3 db. worse than c.w., but let's compare it with a.m. phone. First off, we are keeping our modulation at 100 per cent at all times, instead of only on peaks. This results in 3-db. advantage in useful sideband power for n.m.c.w. (or any kind of m.c.w.). By reducing the bandwidth from 6 kc. to 500 cycles (assuming the receiver is now used in the "sharp" position), we cut down the noise by a factor of 11 db. Our useful signal is 3 db. stronger than a.m., our noise 11 db. less, giving n.m.c.w. a 14-db. advantage over a.m. This checks, for as we recall, A1 has 17 db. over A3, and we proved earlier that A1 has only 3 db. over n.m.c.w. 17 minus 3 is 14, so we're right!

For the use of n.m.c.w., instead of c.w., we are paying 3 db. in S/N ratio. What are we buying for the 3 db.? 0.5A2 has two main advantages over A1, to wit:

a) Complete stability of copying note: Transmitter drift, or h.f. oscillator or b.f.o. instability can not change the copying note. Stability is guaranteed.

b) N.m.c.w. is completely compatible with receivers adjusted for both c.w. and phone reception. No matter whether the receiver is on c.w. or phone, a call on n.m.c.w. is copiable either way. This can be very important when fishing for DX, as in a tropospheric opening. You can call CQ and be sure that you will be heard by either the station with his b.f.o. off or the station with his pass band too sharp to copy phone. If he's listening on your frequency, he'll hear you. If his b.f.o. is on, he'll copy you as a c.w. station; if he is set up for phone, he'll copy you as an m.c.w. station. This compatibility feature is very useful when you are fishing for DX rather than skedding a specific station. A sked can be synchronized to one mode of reception. Random work cannot, and unless you are on n.m.c.w. you might risk losing the chance to contact those whose receivers aren't set up for your mode. Note, too, that n.m.c.w. retains the binary (it's there or it isn't) feature that makes c.w. useful in aurora work. If you have a stability problem, n.m.c.w. may be your answer to successful aurora work.

(Continued on page 164)

• Recent Equipment —

Hammarlund HX-500 Transmitter

THE name Hammarlund is a familiar one when it comes to receivers and components, but most hams do not associate it with packaged transmitters. Thus the release of the new model HX-500 transmitter has a somewhat special interest for those who keep an eye on the equipment parade. The HX-500 has a number of novel features, and its operating capabilities should satisfy operators with widely-varied tastes — from the teletype enthusiast to the dyed-in-the-wool c.w. man, with most types of phone in between.

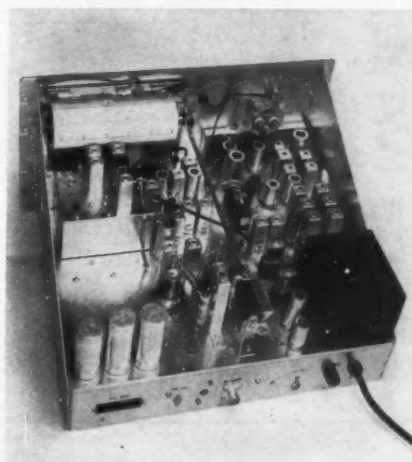
Hammarlund has included in the HX-500's two-tone gray cabinet a self-contained transmitter which will cover the five amateur bands from 80 through 10 meters and is capable of transmitting either upper or lower s.s.b., double sideband with carrier (a.m.), c.w., f.m. and f.s.k. Its power output on s.s.b., c.w., f.m. and f.s.k. ranges from 70 to 100 watts, and on a.m. the carrier output is 17 to 25 watts. VOX and antitrip circuits are included.

A large slide-rule dial, with eight calibrated scales on a rotating drum, indicates the frequency of operation in 10-kc. steps. Each range is 500 kc.: 3.5-4.0, 7.0-7.5, 14-14.5, 21-21.5, 28-28.5, 28.5-29, 29-29.5 and 29.5-30 Mc.

The assortment of types of emission in the HX-500 would seem to indicate the phasing method of s.s.b. generation, but the fact is that the filter method is used with an LC filter operating at 60 kc. How do you get f.m. or f.s.k. when using the filter method? Simple — Hammarlund generates f.m. signals by using a reactance tube to modulate the transmitter's basic frequency-determining oscillator at 60 kc. By generating true f.m. (not phase modulation, as in the case of phasing rigs) it is also easily possible to add the f.s.k. feature — something that is not inherently a feature of the p.m. output of a phasing exciter.

Before going into more details of the HX-500's circuit, a look at the block diagram in Fig. 1 will aid in visualizing the operation of the various stages.

The low basic frequency, 60 kc., insures extremely stable operation — stated to be better than 10 cycles after warm up. A reactance tube modulator, V_4 , is used for generating f.m. and f.s.k. emission and functions by being effectively tied across the tank circuit of the 60-kc. oscillator. When modulation is applied to the reactance modulator it produces a frequency shift in the oscillator at an audio rate. The circuit is designed to limit the maximum audio shift to about 3000 cycles. A variable cathode resistor provides the means for adjusting the frequency deviation and compensating for component aging and tolerances. This is a front-panel control labeled FSK — FM/ΔF. The amount of frequency shift

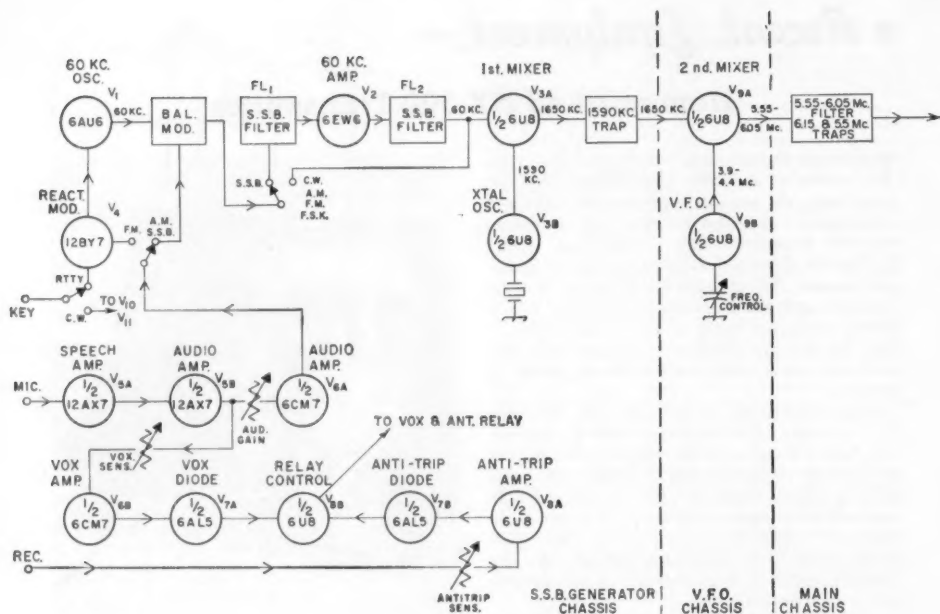


Components are grouped on two subchassis in the HX-500 transmitter, with the assemblies interconnected by removable coaxial cables. The s.s.b. generator chassis is at the upper right in this photograph and the v.f.o. chassis is just below and to the left of the drum dial. The main chassis supports the power supply and the remainder of the r.f. components. The variable capacitor is for final plate tuning; a perforated cover (not shown) fits over this capacitor and the final-amplifier tubes to the left.

can be set up to a maximum deviation of about 2000 cycles for f.s.k. In actual operation the f.s.k. system is keyed by the teletype machine through connection terminals provided at the transmitter's rear apron. If a key is inserted in the front-panel key jack and closed while the transmitter is in the f.s.k. function the carrier will be shifted about 40 cycles, thus providing a convenient way of sending (with the hand key) station identification as required in amateur rules and regulations. In all other emissions the reactance modulator is switched out of the oscillator circuit.

Following the fundamental 60-kc. oscillator, V_1 , is the balanced modulator, which makes use of two semiconductor diodes in its circuit. For a.m. and s.s.b. emission, audio from the speech section (V_{5A} , V_{5B} and V_{5C}) is also fed into the balanced-modulator circuit. The balanced-modulator output may then be switched either to the sideband filters for s.s.b. or directly to the first mixer, V_{2A} , for other types of emission. Carrier suppression is rated to be 50 db. or more.

When in the s.s.b. mode, the signals are passed through a filter, an amplifier and then another filter where the undesired sideband is removed. The first filter (FL_1 in Fig. 1) is actually composed of a series of three separate tuned circuits,



top coupled through small capacitances. The second filter, FL_2 , has five similarly-coupled tuned circuits, plus a special bifilar "T" rejection filter. The trap's notch is set for maximum rejection of the unwanted sideband at 250 cycles from the nominal carrier frequency. The 60-ke. amplifier, V_2 , is inserted between the filters to compensate for any losses and to isolate these two filter circuits for optimum performance and waveshape. The choice between lower and upper sidebands is provided for by changing the operating frequencies of the filters, by switching additional tuning capacitance in or out.

Depending upon the mode of emission, signals either from the sideband filter, FL_2 , or from the balanced modulator are fed into the pentode section, V_{3A} , of a 6U8 operating as the first mixer. Here, 1590-ke. energy from the crystal-controlled oscillator V_{3B} (the triode section of the 6U8) is mixed with the 60-ke. signal to produce the first i.f. of 1650 ke. A 1590-ke. trap in the plate circuit of V_{3A} rejects any oscillator signal that might feed through. Also located in the first-mixer plate circuit are additional tuned circuits for further shaping of the 1650-ke. pass band.

As the dotted lines in Fig. 1 indicate, the HX-500 is constructed on several subchassis. Signals from the first mixer leave the s.s.b. generator chassis by way of a detachable coaxial cable which plugs into the v.f.o. and second mixer chassis.

The v.f.o., the triode section of V_{9B} , has a 500-ke. frequency range, 3.9 to 4.4 Mc., which is combined with the 1650-ke. signal from the first

mixer to give a second i.f. of 5.55 to 6.05 Mc. Good v.f.o. frequency stability is insured by use of a ceramic coil form, temperature-compensated components, and a high- C oscillator circuit. Also, the mechanical isolation of the v.f.o. on a separate subchassis adds to its stability, which is rated at 100 cycles after warm up. Frequency control for the transmitter consists of a panel FREQUENCY control knob which is directly coupled by a gear arrangement to the v.f.o. tuning capacitor. The frequency knob is calibrated in kilocycles and can be read to 200 cycles. One revolution of the knob covers 20 ke. on all bands.

Output from the second mixer, V_{9A} , is fed via a detachable coaxial cable to a pair of broad-band amplifiers, V_{10} and V_{11} , located on the main chassis. However, before going into these amplifiers the signal passes through a series of filters and traps to do away with any spurious frequencies that might be present. The band-pass amplifiers also function as the keyed stage when in the c.w. mode, and are biased off during receive or standby. The panel R.F. LEVEL control varies the bias on the amplifiers and is adjusted to suit whatever drive is required for the following stages.

It will be noted in Fig. 1 that an automatic level control (a.l.c.) line runs from the final amplifiers, V_{15} and V_{16} , to an a.l.c. rectifier, V_{17B} , and then to the band-pass amplifiers. This represents the path of a control bias with an amplitude corresponding to the transmitter's output. A small amount of output from the final amplifier is sampled and rectified by the a.l.c. rectifier. This bias is then applied to the grids of the band-pass am-

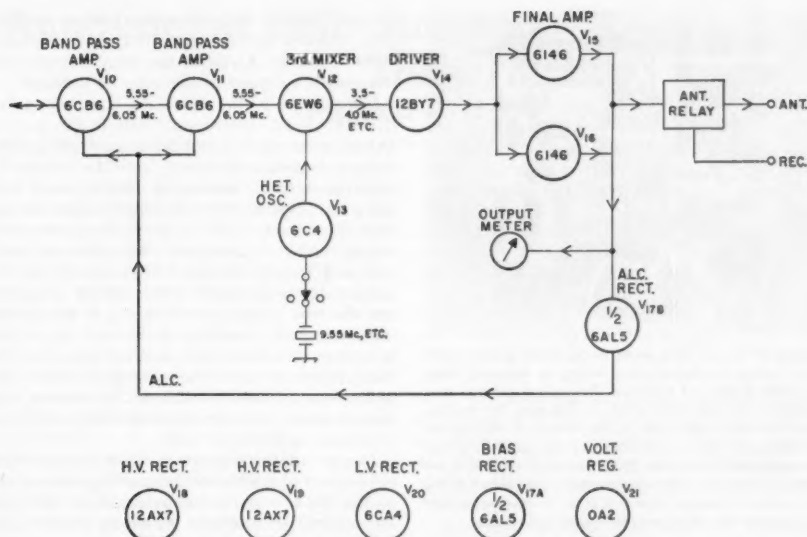


Fig. 1—Block diagram of the Hammarlund HX-500 transmitter.

plifiers giving a sort of a.g.c. action. When the transmitter output exceeds a predetermined value, a.l.c. control voltage is developed and limits the output of the band-pass amplifiers. This regulating action automatically prevents overdriving of the final amplifiers.

After leaving the broad-band amplifiers, V_{10} and V_{11} , the 5.5–6.05-Mc. signal is converted to the third i.f., which falls in the desired amateur band — between 3.5 and 30 Mc. The conversion is done in the third mixer, V_{12} , which receives the proper injection from the crystal-controlled heterodyning oscillator, V_{13} . The correct crystal for the oscillator is switched in, along with several other circuits located throughout the transmitter, by the panel BAND SELECTOR switch. Eight crystals are used, four being necessary to cover the 10-meter band.

The signal which has now been converted to the desired frequency is amplified in the 12BY7 driver, V_{14} . Its grid and plate circuits are tuned by the panel DRIVER TUNE control.

Parallel-connected 6146s operating Class AB₁ are used in the final amplifier. The plate circuit of the amplifier is tuned by the panel FINAL TUNE control. The amplifier circuit is neutralized and the tubes contain suppressors to prevent parasitic oscillations. These tubes and nearby components are cooled by a fan blower attached to the top lid of the cabinet. The pi-network output circuit is designed for a fixed load of 50 ohms; there is no loading control on the transmitter.

The output-meter circuit shown in Fig. 2 can be used as an aid in tuning the driver and amplifier to resonance and also to monitor the transmitter's relative output while on the air. The meter circuit is somewhat unusual in that it uses

two diodes instead of the customary single rectifier. The 1N34A crystal diode, CR_1 , is tapped down on a resistor voltage divider where it rectifies the r.f. voltage from the final amplifier. The d.c. is filtered in an RC filter network and appears across the silicon diode CR_2 . This diode does not conduct until the voltage across it reaches about 0.6 volt, above which CR_2 conducts heavily and acts as a sort of "current brake" as far as the d.c. meter is concerned. With this current limiting, the output meter follows a more logarithmic scale as the output increases. The output meter can be electrically set by the METER SENSITIVITY control located on the front panel.

All necessary power for the HX-500 is generated in the power-supply section of the transmitter. Close to 800 volts d.c. is supplied by the high-voltage section, which uses a pair of 12AX4 rectifiers. A special 12-volt winding on the power transformer supplies the necessary heater voltage for these tubes. Another section of the power supply furnishes intermediate voltages of 215,

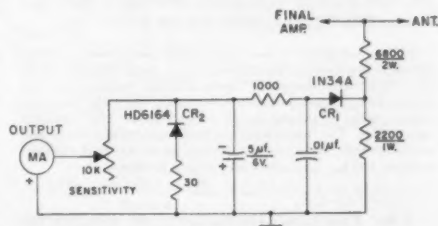
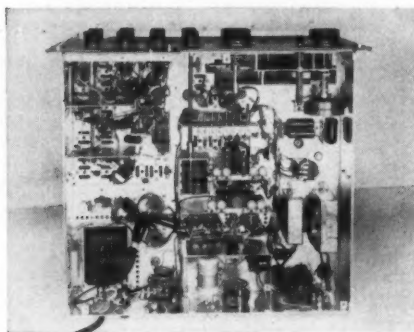


Fig. 2—Two diodes are used in the output-meter circuit. CR_2 , a silicon diode rectifier, conducts only after the voltage across it reaches a little over one-half volt.



This view of the HX-500 shows the compact arrangement of the various components and wiring, as exposed when the bottom plates are removed. The s.s.b. subchassis is in the upper left-hand corner in this photograph. The double-section variable capacitor in the center is the DRIVER TUNE capacitor and at its right are the capacitors and coils connected to the BAND SELECTOR switch, which runs the length of the chassis from top to bottom. The section of the band switch at bottom center is in the compartment that houses the final-amplifier plate inductance.

300 and 350 for use in the various stages of the transmitter. One section of a 6AL5 diode (V_{17A}) functions as the bias rectifier. Bias voltages are 50 and 100 volts. An 0A2 voltage regulator provides stabilized 150 volts to operate the reactance-modulator plate and screen, 60-ke. oscillator screen, v.f.o. plate, third-mixer screen, heterodyne oscillator (V_{12}) plate, and the screen of the 12BY7 driver. Power requirements for the transmitter are 105 to 125 volts, 50/60 cycles, at 400 watts.

The VOX and antitrip circuits for the transmitter are located on the s.s.b. generator chassis. All three controls associated with this circuitry (VOX DELAY, ANTITRIP SENSITIVITY and VOX SENSITIVITY) are on the front panel. Hammarlund

has provided the HX-500 with a built-in antenna relay which is tied into the VOX control system. In the transmit condition the relay connects the transmitter's output to the antenna terminal.

In addition to the operating controls on the HX-500 already mentioned there is also a CALIBRATE LEVEL control, which feeds a small amount of signal from the transmitter into the receiver for purposes of zero beating or finding one's own signal; a FUNCTION SWITCH, which determines the type of emission to be used; an OPERATION switch, with five positions: OFF, STANDBY, MOX, VOX and CALIBRATE; an AUDIO LEVEL control, which adjusts the gain of the speech amplifier; and the FSK — FM/ Δ F control, which determines the amount of frequency shift for f.s.k. or the frequency deviation for f.m. Also located on the front panel are the relative-output meter, key jack, monitor jack (to monitor the receiver with headphones), microphone connector, and low-impedance audio-input jack.

Located on the rear apron of the transmitter is a 14-terminal connector for making connections to the VOX relay contacts, negative 100 volts for receiver or amplifier blocking, remote key, f.s.k. relay, and receiver speaker; also, one pair of terminals is across a 10-ohm resistor from the final-amplifier cathode to ground, for metering purposes. Along with this 14-terminal connector is a coaxial antenna connector, a phono jack for carrying the antenna to the receiver, a fuse and the line cord.

The HX-500 instruction manual contains 31 pages of information including details for using the transmitter on the various emissions, detailed alignment procedures, and voltage and resistance charts for trouble shooting.

The HX-500 cabinet measures $19\frac{1}{4}$ inches wide, $16\frac{1}{2}$ inches deep and $11\frac{1}{2}$ inches high. When the transmitter is removed from the cabinet it will fit a standard rack. It weighs 80 pounds.

— E. L. C.

NEW BOOKS

Transistor Theory & Circuits Made Simple, by Harvey Pollack. Published by American Electronics Co., 1203 Bryant Ave., New York 59, New York. 6 by 9 inches, 124 pages, including index. Price, paper cover edition \$1.75.

This is a beginner's book that takes the subject of transistor theory and breaks it down into a form that can easily be understood. Transistor characteristics, background and basic amplifier and oscillator circuits are discussed in simple terms with a minimum of mathematics and complex schematics. The book describes many practical circuits and explains the operation of devices such as field-strength meters, 100-ke. oscillators and simple receivers.

The Practical Dictionary of Electricity and Electronics, by R. L. Oldfield, includes Handbook. Published by American Technical Society, 848 East 58th St., Chicago 37, Illinois.

$5\frac{3}{4}$ by $8\frac{1}{2}$ inches, 216 pages, cloth cover. Price, \$5.95.

This book is just what the title implies — a dictionary of electrical and electronic terms written in plain language and directed to meet the practical, down to earth needs of the technician, service man and radio amateur. Included in the book is a 38-page handbook section containing formulas, tables, symbols and circuit diagrams commonly used by those working in electricity and electronics.

Transistors, Theory and Practice, by Rufus P. Turner. Published by Gernsback Publications, Inc., 154 West 14th St., New York 11, N. Y. Second edition. $5\frac{1}{2}$ by $8\frac{1}{2}$ inches, paper cover, 160 pages, including index. Price, \$2.95.

In this second edition the book *Transistors* has been brought up to date, and information has been included on transistor limitations. There are also new bibliographies and tables. Although most chapter headings have remained the same, the material in them is the very latest. Two new chapters entitled "Related Devices" and "Care and Handling of Transistors" have been added. The book is directed to teachers, students and technicians alike and contains many practical circuits of interest to amateurs. — E. L. C.

Announcing 1960 Simulated Emergency Test

October 8-9, 1960

HOLD ON! Don't turn this page until you've read what it's all about. Just because you've never heard of the Simulated Emergency Test doesn't mean that it's of no concern to you. Come on out with the AREC gang and have some fun doing something useful, for a change.

We'll try to make it simple. The SET is the week end when we amateurs show the public and the various agencies we might serve in an emergency what we are capable of doing for them. It's not a contest, like the Field Day, and it's not part of a big government-sponsored project, like Operation Alert. It's our own activity, using our own amateur-sponsored and amateur-led organization.

This doesn't mean we ignore all other agencies in conducting the activity. We can't conduct emergency communications unless we have someone to conduct them for. So the Red Cross, civil defense, utilities, newspapers, fire departments, law-enforcement agencies and many others come into the picture to provide the content of the communications, while we in the Amateur Radio Emergency Corps do the communicating.

Here's how you can participate in the SET:

(1) Get signed up in the AREC, if you aren't already. Your local Emergency Coordinator is the man to see. If you don't know who he is, make some inquiries. Maybe you'll find you have no local EC, because no one locally has taken an interest in this type of work. If such is the case, it's time you get some local amateurs together and do something about this, and *right now* is the time to do it.

(2) Your EC, if any, may be planning to have the SET at some time other than the regular October 8-9 week end. If so, you will want to know when so you can plan to take part. If he

says he is not going to have an SET, give him a hard time, eh?

(3) During the test, you should originate a message to your SEC (that means *Section Emergency Coordinator*, you clown). Your message should be *short* (say about 10 words) and it should identify the group with whom you are working. It should also identify *you*, by call letters. There may be hundreds of people with your name, but your call is unique.

(4) Your EC has a report to make. Chances are he won't bother to send it in (we hope he will) unless he has something he feels is worth reporting. *You* can provide him with that by showing up, by going along with the spirit of the thing and by showing your interest in a continuing AREC organization in your community or county.

American National Red Cross and the Office of Civil and Defense Mobilization will be taking part in the SET also, on a national scale. If you go in for long-haul traffic handling, you can make yourself useful on the National Calling and Emergency Frequencies in addition to (not instead of) participation in your local drill. There will be traffic from Red Cross chapters to national RC headquarters, from local c.d. directors to OCDM, and from ECs to ARRL.

What? You don't know what the National Calling Frequencies are? Gad, we thought *everybody* knew that! Lessee now... Oh yes, here they are! For short and medium haul: 3550 and 3875 kc.; for medium and long haul: 7100 and 7250 kc.; for long haul and very long haul (if the bands are open): 14,050, 14,225, 21,050 and 21,400 kc.

See you in the SET, OM... Oct. 8 & 9!

—W1NJM.

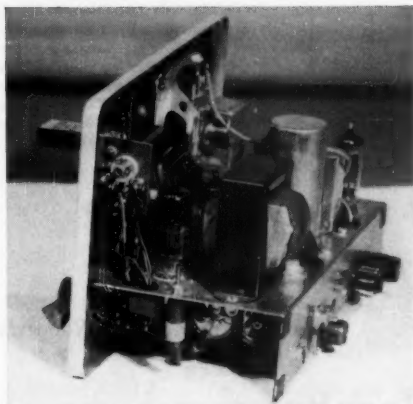
Supplement—June V.H.F. Party Summary

THE following scores are a supplement to the June V.H.F. Party Summary on page 58, September *QST*. The footnotes call attention to the certificate status in the respective sections. Columns indicate final score, number of contacts, the section multiplier, and the bands used.

Connecticut		Maryland	
KN1OAV ¹	80-16-5-A	K3KHS	1320-110-12-A
Northern New Jersey		K3IEV	825-75-11-A
W2PEZ	(10 ops.) ²	W3JWY	168-24-7-A
31,632-620-48-ABC		K3IIR	120-30-4-A
W2OR	(4 ops.)	K3JKQ	116-20-4-A
12,090-465-26-AB		K3IIP	96-32-3-AB
N.Y.C.-L.I.		W3BLH	9-30-3-A
W2YHP ²	4686-213-22-AB	K3BPZ	88-22-4-A
K2MGA	3040-190-16-A	W3BGM	84-42-2-A
W2FBA	496-62-8-B	W3JQR	61-21-3-A
K2OCT	390-30-10-A	K3IEZ	48-24-2-A
Western New York		Eastern Florida	
K2SZJ	(K2s IXJ DRB, W2-SFU)	K4PPX	660-60-11-AB
10,434-282-37-AB		Georgia	
W2MAU ²	(9 ops.)	W4GIS	66-22-3-AB
4075-159-25-ABC		W4FWH ⁴	(4 ops.)
			361-157-23-AB

South Carolina		San Francisco	
K4YIP ¹	629-37-17-A	K6VXI	230-46-5-A
Tennessee		Illinois	
W4AZD ²	(5 ops.) ²	W9RVG ²	2768-136-13-A
2730-130-21-AB		K9HDE	1200-103-12-AB
Virginia		K9PEA	162-27-6-A
W4AO ⁴	12,516-284-42-ABCD	W9KBF	140-20-7-AB
W4VVE	304-38-8-AB	Indiana	
K3CEZ ⁴	(8 ops.)	W9MHP	840-70-12-AB
4200-1722-4-ABC		K9MZV	657-73-9-AB
Northern Texas		Iowa	
K5UJM	2196-122-18-A	W8LIM ⁹	(W8LIM, K9OQZ, K9YHE)
East Bay			840-60-14-AB
K6RNQ ²	1573-111-13-AC	Ontario	
Los Angeles		W6UFJ ⁶	(W6UFJ, W66 FCY FXJ) ²
W6UFJ ⁶	(W6UFJ, W66 FCY FXJ) ²	VE3ELA ³	(VE3s ELA CIB)
102-34-3-B			1666-98-17-AB
Santa Clara Valley		Manitoba	
K6DTR ²	2520-125-18-ABCD	VE4YW ²	39-13-3-A

¹ With three Novice entries. KN1MQW is Novice Certificate Winner. ² Multitop Award Winner. ³ Section Certificate Winner. ⁴ W4YMD, opr. ⁵ With three multitop entries. W6ACID is Multitop Certificate Winner.



W9AMH's modification to the Sixer. The L-shaped bracket for mounting the 6C4 oscillator tube is visible in the foreground behind the front panel.

When tuning up, simply adjust the slugs in the new coil, L_{201} and L_{202} , until the output indicator shows maximum brilliance. The output will be somewhat greater than before, since the two stages provide more drive to the final amplifier.

— Harry A. Perry, W9AMH

— — —

THE overtone crystal oscillator in my Heathkit HW-29 six-meter transceiver worked somewhat erratically. After some experimentation I found that when the value of the oscillator grid resistor was raised from 10,000 to about 40,000 ohms the oscillator settled down to stable operation.

— Chester L. Smith, K1CCL

SENSITIVE METER PROTECTION

TO protect sensitive instruments from damage while transporting or handling, connect a shorting wire across the meter terminals. In the case of a v.o.m., switch the meter to the lowest current range and short out the test leads. If the meter pointer is set into motion by vibration or shock, a small current will be induced in the meter which tends to oppose the original movement of the pointer. This electrical damping will keep the pointer from swinging freely and damaging the instrument.

— Richard Niessen, K2SRA

CIRCUIT CHANGE FOR THE HEATHKIT MT-1 MOBILE TRANSMITTER

RECENTLY I constructed the Heathkit MT-1 mobile transmitter. I noticed that the plate of the 6CL6 v.f.o. buffer tube would glow a dull red if the transmitter were left on for more than a few seconds. All voltages and resistance measurements were checked against the instruction manual and were found to be correct. However, I

did notice one thing — the 6800-ohm, 1-watt screen resistor was dissipating more than one watt. With a 100-volt drop across the resistor (which is normal according to the instruction manual) the calculated dissipation was 1.4 watts. The maximum allowable screen current for the 6CL6 is around 7 ma. and the current through the resistor in my case was about 14 ma.

Checking similar equipment using this tube, I found that a 68,000-ohm resistor was typical in circuits of this kind. Not having a resistor of this value in my junk box, I substituted a 33,000-ohm, 1-watt unit. Now the plate of the 6CL6 runs cool and I still have more than adequate drive on all bands.

— Richard M. Bender, W3SYV

S.S.B. WITH THE 10B AND VALIANT

IT may interest other Valiant owners to learn that the Central Electronics Exciter 10B makes a nice s.s.b. exciter for the Johnson Valiant transmitter. Only one minor change in the Valiant is necessary. Replace the sideband input coupling capacitor C_{101} with a 0.01- μ f. ceramic capacitor. Also, the 10B output inductance should have its 10,000-ohm swamping resistor removed.

— Dorothy C. Saunders, W4UF

RANGER OPERATING CONVENIENCE

A SIMPLE external metering circuit which facilitates tuning the Johnson Viking Ranger is shown in Fig. 3. This circuit replaces the high-voltage jumper wire on the Ranger auxiliary power plug X_{13B} .

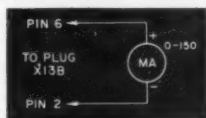


Fig. 3

During phone operation, the milliammeter (M_1) indicates 6146 plate current. The Ranger meter switch can remain in the final-grid-current position continuously. Tuning of both grid and plate circuits is accomplished more quickly because the necessity for back-and-forth meter switching is eliminated. Continuous monitoring of plate current will prevent many unintentional overloads and prolong 6146 life.

The meter may be mounted in any convenient location near the transmitter. Precautions should be observed to prevent accidental physical contact with the meter terminals since approximately 500 volts d.c. is present at any time the Ranger OPERATE switch is moved to PHONE or cw. However, because of internal wiring, the outboard circuit will not function in the cw mode of operation.

— John W. Browning, W8DDF

That grin belongs to W0JNW, who shown here at VP1JH set an all-time high record in ARRL DX Contesting with 1,377,918. The gadget on top of the Ranger has two code wheels made of clear plastic. Pushing the left button on the small control box in front of the receiver causes the gadget to key the Valiant with "599200". Pushing the right button sends "de VP1JH." Bob assures the gang that signals really were 599 down there.

1960 DX Contest

Shatters Score Records

Official Results— 26th ARRL International DX Competition

AT LAST, the ARRL DX Contest has been described to a tee! Perfecto! Read this jazz by VE2AEW from *Skynave* of the South Shore ARC about our beloved DX Contest.

That DX Rat Race

So u want to try it es u find a big pile up es wud like to get ur feet wet so u luk fer a DX call in there but nobody is using it es u don't know which way to point ur beam es by es by sum lid slips and lets it out so u see if you can hear him es sure nuf he's down in there so u pile on but he won't answer u es when the pack shuts up there he is handin out numbers so u go lukin fer the guy he's working so's to get a slant on his freq es he still won't answer u so u figger now he must be listening on the side so u go lookin fer some guy handin out numbers over there and u wonder if he's in ur pile or the next one es go back to the DX quick to see if he gives the guys call but the pack jumps him B4 he gets to it es when the pack shuts up there he is handin out numbers es u finally figger its only to the Texas galons es the California kilowatts so u move over to another pile es start all over again */#!%*???

But, ah yes, you notice that the ardent DX Contester jumps right back in for more of the same punishment . . . something like a fighter getting off the canvas after giving a close look-see at a left hook. It's a free-for-all, true, but fun for all too! . . . which all leads us into the specifics of the 1960 Contest.

How about the conditions? Anyone tuning across the DX bands realizes that the sunspot cycle is definitely on the downward trend. But all is not lost. W3DHM noted: "Conditions on 10 meters are certainly on the decline, but 40 was great." "Biggest thrill was the 7 Mc. DX, although it was very hard for me to come by," de K3DFK. Z8JJ commented: "Conditions taken as a whole over the entire contest were good, even bordering of excellent over the first half." W3LEZ spoke for this side of the pond, noting conditions quite in reverse: "First week end lousy; second week end tremendous." On phone K2GXI miked: "Conditions pretty good,

there being more activity on 15 than last year, but 10 was poor to Europe during the second week end." W2HUV glowed optimistically: "Next year I'm looking forward to operation on 40, 20, 15, and 10 with good conditions — sunspots or not!" Better not miss out on 80 and 160 though.

The "by a whisker" department found W3QQL ducking under the wire: "The FK8AH pile-up was the climax to the whole affair. I was lucky to get him 12 minutes before the contest was over." W3MFW (at W3ECR) sang these praises: "Congratulations to these outstanding signals/operators — VP1JH, VP5ME, VP6YB, KS4AZ, HZ1HZ, DU7SV, etc. They really make a contest enjoyable." K6BWX had his nominations: "For cleanest DX signal and operation I



Big smiles mark the boys at W3AOH who broke the magic million marker to set an all-time high multi-op W/VE score. Back row left to right: W3AOH, K3DKD, W3VKD, W3UHN; front row left to right: W3MVQ, W3LMM, W3WGH, W3QJJ.



nominate XE1PJ . . . for the hardest call for an op to work with—ZD2JKO . . . biggest pile-up—HK0AI (and I didn't work him either)." W7PQE joins in: "Nominations—bravest operator JA1BRN with his two watts . . . quickest on the draw VP1JH, with a whole lot of other sharp operators as close seconds."

K3HLJ whooped: "Like help . . . for this contest you need a beam, kw., and a pound of coffee." Meanwhile W1OKG suggested more s.s.b. operation: "Only 9% of my QSOs were with s.s.b. stations, whereas there are supposedly over 200 DX countries now on sideband."

The one-band efforts certainly deserve credit. Let's remember, however, that versatility is the thing! W3JTC (ex-SV0WP) snagged 132 countries on 14 Mc. On that band W6CUQ bagged 111, K4PDV 107, W6LRU 103, and W1HZ 103 in as many contacts . . . all single band efforts. PJ2AV scored 888 QSOs in 20 call areas on 14 Mc. Note that all of Maine's c.w. entries are from two-letter calls and all over 100-K. Who says the Old Timer's can't do it anymore?

KH6DJP enjoyed his new viewpoint from the W/VE side of the fence: "Got quite a kick out of many of the stations saying, 'Thanks very much for the new state and multiplier.' It makes one feel that all has not been in vain when somebody appreciates your efforts just a little bit." K4VNY introduces others who have a claim to fame: "I believe a lot of credit should go to the Russian fellows. They really went all out to put some rare spots on the air." "Glad to see so many South and Central Americans on."—W1QMM. "My Korea phone contact alone was worth the

participation."—K6BOB. And congratulations to Vic Clark & Co. who livened up the first week end from KS4AZ.

The DX Contest is an excellent way of picking up new countries for DXCC. Said W8OOR: "This effort plus a few recalcitrant QSLs should finally make DXCC!" (For the less erudite, Webster's is a must!—Ed.) In summation, VP3HAG sighed in relief to KP4AIU: "I'm tired, hoarse, but had a heckuva good time." To which KP4AIU concurred: "My sentiments exactly!" . . . and TF2WEN still needs a TF QSL; things are TuF all over, aren't they?

C.W. Highlights

The W/VE spotlight again shines on W3MFW, who keyed the W3ECR rig to the top score in the country with 860 QSOs, a multiplier of 351, and grand total score of 905,580. Maryland's W3GRF was second with 784 contacts, multiplier of 354, and grand score of 831,192. And for the second year in a row, Ohio's W8FGX was third with 827,526 points. Other single ops keying over a half million were: W4YHD 773,544, K2DCA 749,664, W3ALB 733,408, W3DHM 698,472, W2AYJ 652,365, K2DGT 621,900, W1JYH 618,696, W9WNV 602,301, W9IOP 581,833, W2EQS 566,772, W1LOP 543,444, W3VAN 522,567, W4RQR 512,451, W1BIH 500,408.

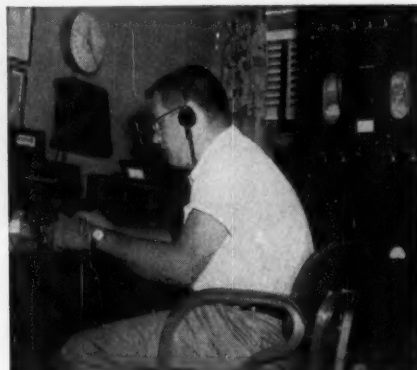
Nothing short of superb describes the multiple operator scores turned in. The first W/VE million-plus scores were turned in by no less than two entries! Two W3 multiple operator outfits turned the trick. Eight operators at W3AOH combined operating skill to score an

FK8AH stirred up noise on c.w. with this 6146 rig and 50 watts.



October 1960

Here we have the top W/VE scorers for phone and c.w. On the left is W1ONK pausing from microphone duties that brought home 423,990 points. Below is W3MFW who from W3ECR was the highest scorer for the second year in a row. Note the southpaw action on the bug.



C.W. Call-Area Leaders

Single-Operator

W1JYH.....	618,696	W9WNV.....	602,301
K2DCA.....	749,664	W0BTD.....	247,725
W3ECR ¹	905,580	VE1PQ.....	170,880
W4YHD.....	773,544	VE2YU.....	174,303
W5CKY.....	448,800	W0AIH/VE3.....	413,184
K6VTQ.....	393,066	VE4XO.....	51,975
KH6DLF.....	90,375	VE6HG.....	16,422
W7PGS.....	324,324	VE7BBG.....	8505
KL7CDF.....	60,435	VO2NA.....	5983
W8FGX.....	827,526		

¹ W3MFW, opr.

all-time W/VE record . . . 1,210,612 points. A 403 multiplier, coupled to 1002 exchanges spelled this 90 hour marathon. A close second was W3MSK operated capably by four people to rack up 1,203,408 points with 976 contacts, and a 411 multiplier. Bouquets to these two multiple operator groups for being the first of the W/VE crowd to break the magic million. Now, who will be the first W/VE single op to do it . . . ? Five other multi-ops broke the 500-K level: W3BES 745,875, W6RW 602,301, W4KXV 599,794, W3KFP 590,716, W3WV 552,535.

The Canadians really came up with some terrific scores this year with W0AIH/VE3 setting the pace with 413,184 points . . . which by far must be a record single op Canadian score ever turned in. VE2YU scored 174,303, and VE1PQ chalked up 170,880. Multi-op VE2WW scored 482,232.

Africa. Tops on that continent was ST2AR with 271,719 credits. Following right behind were: ZD2JKO 191,277, ZESJ 143,640, ZS6AOU 116,370.

Asia. JA1VX chalked up four years in a row now by scoring 210,273. Other highs were HZ1HZ 97,458 and UA9KZA 93,200.

Europe. European scores and activity dropped off considerably from last year, but none-the-less G4CP did a fine job in leading the continent with 394,200 digits. Others turning in fine scores and over 200-K were: UB5WF 388,734, GW3JI 299,460, ON4LX 237,850, G2QT 210,447, OE1-

RZ 208,919, OZ1W 207,552, F8VJ 205,326.

North America. An epic performance of record shattering magnitude . . . sure to be a classic for which future DX Contestants may shoot . . . was etched upon the channels of DX Contest records. Bettering XF1A's 1957 1,281,702 record, ARRL's Midwest Division Director W0NWX pounded VP1JH brass for 1,377,918 points, an all-time contact total of 4037 (first to break 4000), and tying Juan's multiplier of 114 . . . va-va-voom! Hats off to W0NWX (VP1JH)! Others high flying on this continent: KP4AOO 701,136, VP5ME 575,343, VP7NT 525,063, and multi-op K8AAZ 518,568.

Oceania. Contest stalwarts VK2GW and ZL1MQ lead this area with 341,670 and 287,763 points respectively. FK8AH created many pile-ups as he scored 107,484. Meanwhile the ever-popular DU7SV scored 119,760, as Midway's KM6BQ came through with 146,205, and four operators put KG6FAE in business with 337,392 points.

South America. VP3YG was tops here with 481,500, pursued closely by: PY1ADA 469,854, YV5GO 389,781, CE3AG 374,070, ZP9AY 216,540, HC2IU 181,720, CX2AZ (multi-op) 295,920. This was quite an increase over last year's scores from South America . . . this healthy rise in activity was certainly welcome.

Phone Highlights

The W/VE phone footlights rest on W1ONK who stood head and shoulders above the other phone DXers with 423,990 points via 673 QSOs and a 210 multiplier during his 86 hour microphone binge. Clobbering 100-K were: W3DHH 318,150, W1PDF 266,994, W3ALB 222,855, K2GXI 180,363, W9EWC 216,656, W9NZM 159,720, W8NXX 151,662, K1JTC 136,456, W8ZOK 134,505, W1FZ 134,332, W2ZX 132,800, K2DGT 118,503, W2PUN 118,008, W3ECR

Phone Call-Area Leaders

Single-Operator

W1ONK.....423,990	W9EWC.....216,656
W2ZX.....132,800	K0LFY.....48,000
W3DHM.....318,150	VE1PQ.....37,380
K4QIJ.....105,276	VE2ACU.....56,753
W5ALB.....38,885	VE3EHR.....100,440
W6AED.....70,560	VE4SD.....28,575
KH6CJJ.....6789	VE5RU.....70,446
W7CBB.....7956	VE6TP.....18,585
KL7CDF.....17,802	VE7CE.....7434
W8NFX.....151,662	VO2NA.....3388

117,747, W1AUF 110,544, K4QIJ 105,276, K4ZCP 102,714, VE3EHR 100,440.

Michigan multi-ops W8NWO and W8NGO had a battle royal with 244,728 and 238,572 respectively. Others over 100-K: W1ETF 157,035, W3KFQ 145,080, W3GRF 123,924.

The DX gang put on quite a show in handing out phone contacts in grand style. Top DX phone score was VP2DX with 506,250. Here's how the other DX stations over 50-K shaped up: KP4AIU 279,488, ON4OC 244,288, EA3JE 193,068, VP3HAG 177,072, YN4CB 172,746, HK0AI 169,050, TI2RO 119,534, DJ1BZ 114,534, VP2AR 109,620, OH5SM 106,050, ZL1MQ 90,540, HK3LX 86,240, G2DYV 85,491, CO2DD 85,260, TG5HC 82,404, HP1AC 79,991, ON4GM 77,428, LA1JG 76,986, OZ5JT 64,872, LA4TE 60,114, LU1DAB 58,135, PA0HBO 55,620, ON4LX 52,250, VR2BC 51,435. GB2SM earned a multiple operator certificate for England with 178,059.

The Clubs

The club totals look like a carbon copy of last year's results with the first four finishers exactly in position as last year. It was the usual nip and tuck affair between the Frankford and Potomac Valley crews, but Frankford's phone scores were just too much to offset the slight lead that Potomac made on c.w. Third and fourth place was another repeat with the Northern California DX club again beating out the Southern California DX Club by a whisker. Others over a million were the Order of Boiled Owls, Connecticut Wireless Assn., and the Ohio Valley Amateur Radio Assn., in that order. In all, 36 clubs participated, with 30 c.w. and 13 phone club certificates stashed away.

G4CP puff-puffs on the pipe in hand . . . and puffing away to lead the pack in Europe on c.w. with 1752 QSOs for 394,200 points . . . but never satisfied, England's leader is aiming for 2000 contacts next year.

Disqualifications

The calls listed in this paragraph are all deemed ineligible for score listings or awards. Under contest rules 13 and 14, the following have been disqualified because of log discrepancies in their entries: C.w. — W1GET, W2SSC, K5DGI, W6TT; Phone — W2SSC. In each of the following cases disqualification was under contest rule 14 in view of non-observance of FCC rules as reported by at least two accredited Official Observers, or by a single FCC citation. Such violations as out-of-band operation, key clicks, phone splatter and spurious emissions were the criteria for these disqualifications: C.w. — W1BB, W1HGT, W3BB, W3DQG, W4YUU, W9IRH; Phone — K1HRM, W2CGJ, WA2DGG, K2LWR, W2OKM, K2TAP, W4BVV, W7PGS, W8ZL, K0RNZ.

Twenty-Sixth ARRL

International DX Competition

Operator of the station first-listed in each section and country is winner for that area. . . . The multiplier used by each station in determining score is given with the score — in the case of U. S.-Canada this is the total of the countries worked on each frequency-band used; in the case of non-W/K/KH6/KL7/VE/VO entries it is the total of the U. S.-Canada districts worked on each band. . . . The total number of contacts is listed next. . . . The letters A, B, and C approximate the input to the final stage at each station; A indicates power up to and including 150 watts; B indicates over 150 watts, up to and including 500 watts; C indicates over 500 watts. . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Examples of listings: W3ECR 905-580-351-860-C-78, or final score 905,580; multiplier 351; 860 contacts; power over 500 watts; total operating time 78 hours. . . . Stations manned by more than one operator are grouped in order of score following single-operator listings in each section or country tabulation; calls of participants at multi-operator stations are listed in parentheses. . . . In sections or countries where three or more multiple-operator entries appear, the top-scoring station is being awarded a certificate.

C.W. SCORES

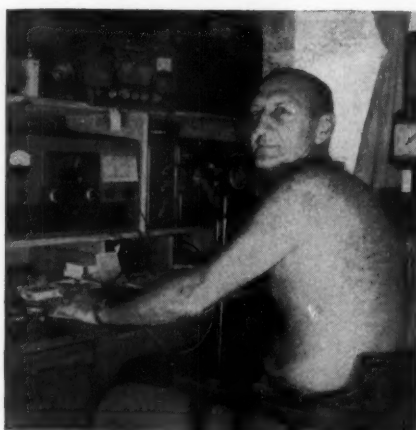
ATLANTIC DIVISION

W3ECR1 905,580-351-860-			C-78	W3HPN 163,761-169-323-			B-44
W3ALB 733,408-328-746-			C-70	W3HHA 153,216-168-304-			C-80
W3DHM 698,472-327-712-			C-91	W3IMV 129,195-135-319-			B-32
W3OCU 412,126-242-569-			C-70	W3EAN 121,176-153-264-			C-7
W3DBX 351,945-337-495-			B-70	W3CTJ 108,750-145-250-			B-27
W3BIP 289,506-226-427-			C-61	W3CHD 95,202-129-246-			B-7
W3RT 284,481-219-433-			C-61	W3QZ 79,236-124-213-			C-37
W3LEZ 230,250-202-380-			C-70	W3CHS 75,516-124-203-			B-21
W3MWC 217,620-195-372-			B-65	W3SOH 48,960-96-170-			A-35
W3CGS 215,340-194-370-			C-58	W3EVV 47,376-94-168-			C-15
				K3JRK 38,916-92-141-			C-27



W3AEM... 25,875-75-115-BC-24
W3ARK... 24,804-78-109-B-10
W3QLW... 22,491-63-119-A-34
W3ADZ... 20,085-65-103-AB-9
K3GFV... 15,795-65-81-B-48
K3DPG... 15,312-68-89-B-20
W3EER... 14,418-64-89-A-35
W3CAA... 11,088-48-77-A-
K3ATL... 8,894-66-63-AB-24
W3ORU... 4,620-35-44-C-9
W3INH... 4,551-37-41-B-10
K3DFK... 4,386-34-43-A-25
W3DYL... 2,968-28-36-C-10
W3NOH... 2,553-23-37-A-3
W3CMN... 2,430-27-30-B-1
W3GRS... 918-17-18-A-
W3BES (W3e BES GYP)
745,875-325-765-C-06
W3KFK (W3e KFK QKV)
500,716-280-682-C-06
W3EQA (W3e EQA GRS)
281,748-212-443-C-60
W3GHM (W3e GHM NOH)
155,556-173-298-B-43
W3BYX (W3e BYX DAO)
113,316-142-266-B-06

W2UVE... 131,370-145-202-C-62
W2QJM... 64,419-109-197-B-24
W2KMY... 57,474-103-181-A-45
K2EVP... 46,452-98-158-B-33
W2TQR... 38,181-8-143-A-10
K2FG... 35,640-90-132-B-28
W2FXA... 31,590-81-130-A-20
W2DGG... 25,008-69-130-A-
K2CD... 24,000-64-125-B-15
K2CKM... 22,311-67-111-C-
K2KNV... 21,939-71-103-B-19
W2DOD... 16,191-63-87-B-20
W2QQ... 14,310-53-90-B-20
W2VUF... 13,936-67-70-B-30
W2HUV... 13,190-56-79-A-22
K2LJC... 8,556-46-62-B-50
W2BEX... 5,472-38-48-A-10
W2TVT... 3,528-28-42-B-18
W2ACJO... 3,510-26-45-A-
W2TKO... 3,276-26-42-A-
K2HUK... 2,349-27-29-A-
W2PDB... 2,190-24-30-B-4
K2ZCD... 818-15-18-B-1
K2SSX... 168-7-8-A-1
W2AAU (W2a AAU PSQ, K2AQQ)
153,825-175-293-C-50



Top DX scorer on phone was DX... yes, VP2DX; that's W8VDJ who spent his winter vacation in Dominica during the DX Contest to post 506,280 points with 1875 exchanges. This sure beats the February cold of Ohio!

Md.-Del.-D. C.

W3GRF... 831,192-354-784-AC-80
W3VAN... 522,567-270-628-C-75
W3MFI... 308,526-254-523-C-
W3EIS... 364,395-255-477-BC-69
W3MSR... 360,126-247-486-C-08
W3IVE... 290,604-228-381-C-60
W3DRD... 256,710-215-398-C-57
W3KLA... 161,304-188-289-B-65
W3FRZ... 130,950-150-291-BC-64
W3JTC... 129,492-132-327-C-68
W3KA... 87,750-125-234-C-19
W3KDP... 82,128-118-232-C-
W3QQL... 82,026-147-180-B-31
W3MVB... 76,125-125-203-BC-78
W3EKN... 69,732-117-200-C-27
W3RNY... 42,129-93-151-C-45
W3GAU... 36,358-98-125-C-
W3WU... 20,400-68-100-B-20
W3BKE... 18,972-62-102-B-20
W3EPR... 17,028-66-80-C-32
W3JO... 6,027-41-49-A-29
W3IWS... 5,016-38-44-B-
W3MEU... 2,625-25-35-A-17
K3DUB... 48-4-4-A-7
WBBPO/3... 12-2-2-A-
W3MSK (4 ops.)
1,203,408-411-976-C-03
W3WV (W3a PZW WV, K3GUR)
552,535-295-625-C-
W3BVN (K2JXX, W3BVN)
147,870-159-312-C-35

Western Pennsylvania

W3MBN... 162,488-177-306-C-50
W3RNN... 162,024-157-344-C-60
W3TXQ... 18,915-65-97-B-27
W3GAC... 15,355-65-85-AC-47
W3LPP... 4,968-36-48-C-5
W3JHT... 2,304-24-32-A-40
W3KQD... 480-10-16-A-3
K3HLJ... 360-10-12-A-4
W3WBH... 243-9-9-B-8
W3AOH (8 ops.)
1,210,612-103-1002-C-90

CENTRAL DIVISION

Illinois
W9WNV... 602,301-301-567-C-74
W9ERU... 446,524-277-538-C-67
W9WTO... 128,928-158-279-C-38
W9FJY... 101,355-145-233-C-25
W9WFS... 95,931-171-187-B-36
K9BGL... 84,822-134-211-A-68
W9PVA... 64,746-109-198-B-31
W9IVG... 59,400-120-165-C-34
W9ZRG... 54,900-122-150-C-
W9MZP... 53,846-108-70-B-38
W9DWQ... 51,198-106-161-B-
W9MGY... 47,985-105-153-A-56
W9DRN... 38,454-97-148-C-
W9QOG... 37,506-94-133-B-28
W9PNE... 27,984-88-110-B-24
K9LNS... 24,382-73-113-A-45
W9FKC... 22,932-75-98-C-15
K9HMY... 19,530-70-93-A-
W9QLD... 10,650-50-71-B-22
W9DCK... 8,370-45-62-A-26
W9LNG... 5,880-40-49-A-10
K9JLR... 4,908-36-46-A-29
K9NSG... 4,830-35-46-B-7
W9WJL... 3,870-30-43-C-7
W9YDQ... 2,736-24-38-B-
K9SPO... 2,592-27-32-A-10
W9VPD... 2,310-22-35-C-6
K9DCF... 2,187-27-27-B-6
W9ZYD... 1,950-25-26-A-23
K9PBY... 1,850-25-26-A-5
W9CLH... 1,633-23-24-A-9
W9QMS... 1,368-19-24-B-13
K9PZF... 1,080-15-24-B-10
K9TTE... 875-15-15-A-4
W9BZW... 432-12-12-B-7
W9REC... 432-12-12-A-6
W9MLQ... 432-12-12-A-14
K9ISP... 29-9-11-A-4
K9JAV... 264-8-11-A-7
W9NIU... 75-5-5-A-4
W9NLF... 27-3-3-A-
Indiana
W9IOP... 581,833-301-645-C-79
W9YSX... 322,143-223-347-C-27
K9CXY... 163,560-174-320-BC-62
W9TKV... 49,377-109-155-B-38
K9RZY... 3744-32-39-B-8
K9SNX... 1,638-21-26-B-15
W9UTQ... 853-15-19-B-6
W9TUD... 546-13-14-C-
K9DFK... 330-11-11-B-5
W9PLB... 198-8-8-B-4
K9IGP... 12-2-2-A-
Wisconsin
W9LNM... 487,377-297-547-C-70
W9QYW... 133,962-166-269-B-
W9WJH... 111,438-151-246-C-30
W9MBF... 96,348-148-217-B-36
W9IHN... 60,000-105-200-B-26
K9ENB... 22,116-76-97-B-24
W9RLH... 21,978-74-99-C-25
W9NLI... 16,320-64-85-A-
W9CBK... 5,002-37-41-B-6
K9KGF... 768-16-16-A-3
Dakota Division
North Dakota
W8SDN... 53,263-109-169-A-39
K9QWY... 2,886-26-37-A-7
K9OSV... 2,496-26-32-A-22
K9OSW... 2,275-25-31-A-22
South Dakota
W8BLZ... 80,883-129-209-C-35
W9FOQ... 624-13-16-A-6
W8LNI/8 (10 ops.)
17,271-57-101-C-
Minnesota
W8JSN... 51,948-111-156-A-48
W8VAF... 21,630-70-103-B-25
W8VIP... 7,137-39-61-B-
Delta Division
Arkansas
K5EJQ... 9063-53-57-A-24
K5GOE... 108-6-A-2
K5GR7... 75-5-5-A-3
Louisiana
W3KC... 344,520-232-405-C-80
W5BUC... 157,770-173-304-C-70
K5LJE... 38,304-96-133-A-40
K5PYN... 33,369-83-134-A-25
K5TFA... 21,087-71-99-B-
W5EKF... 21,420-68-105-B-30
K5UYL... 8,568-51-56-A-
Mississippi
W5CKY... 448,800-275-544-C-53
K5QNF... 9872-52-62-C-13
K5OTI... 912-16-19-A-
Tennessee
K4LPW... 306,144-252-524-B-70
K4REK... 5616-36-32-A-12
W4ODR (4 ops.)
89,598-137-218-C-56

GREAT LAKES DIVISION

Kentucky
W4JBQ... 48,597-97-167-C-28
K4CIA... 6888-41-56-B-8
W4OMW... 3534-31-38-B-10
K4YFB... 1650-22-25-B-5
W4CNE... 1569-18-29-C-
Michigan
W8UPN... 387,543-247-523-C-55
W8UDS... 152,928-177-288-C-65
W8NJP... 147,294-167-294-C-50
W8SVR... 73,125-125-195-C-45
W8NGO... 39,270-100-119-B-22
K8LSG... 26,322-82-107-B-35
W8MCC... 23,625-75-103-C-22
W8OOR... 22,557-73-103-A-35
K8IUT... 22,032-68-108-AB-27
K8QJH... 17,520-73-80-A-40
W8UCI... 13,359-61-73-B-18
W8SS... 11,715-55-71-A-30
W8SPO... 10,152-47-72-A-27
W8CLH... 9,984-52-64-A-27
W8SCU... 7200-40-60-C-18
W8ZL... 6,966-43-54-B-50
K8JCB... 6,519-41-53-B-33
K8ERO... 5,610-34-55-B-25
K8MPD... 2,610-29-30-C-17
K8OEO... 2,016-24-28-C-13
K8OWR (K8a CPM OWR)
864-16-18-A-3

Southern New Jersey

K2DCA... 749,964-342-734-C-85
K2DNA... 242,406-201-402-B-79
W3GGL... 167,376-176-317-BC-57
K2GHM... 149,298-167-298-C-75
K2QIL... 132,756-148-299-B-40
W2SDB... 100,620-129-260-C-38
W2HDW... 90,576-111-272-A-35
W2PAU... 82,344-146-188-C-35
W2EXB... 58,968-108-182-A-13
W2DAJ... 57,942-111-174-B-43
W2QKJ... 51,500-90-190-B-50
W2QDY... 39,420-90-146-A-40
W2BUI... 38,982-83-146-A-21
K2OEA... 18,630-69-90-A-8
K2CPR... 16,482-67-82-A-10
W2NSJ... 15,738-61-83-B-26
W2FVS... 12,300-50-82-AB-22
K2YIB... 7,176-39-62-B-15
K2SQM... 6,600-40-55-A-9
W2ABL... 5,100-34-50-B-13
W2ZX... 4,212-36-39-C-
K2LBT... 3,780-30-42-B-10
W2MPV... 3,741-29-43-B-15
W2REB... 3,321-27-41-B-10
W2AIZ... 2,511-27-31-A-
K2INQ... 2,501-27-31-C-7
K2AIM... 2,070-23-30-B-9
K2HBY... 627-11-19-A-6
W2BLV... 576-12-16-A-5

Western New York

W2SAW... 236,412-198-398-B-50
K2LWR... 230,919-191-403-B-61
W2FBA... 202,476-188-359-B-27
W2BJH... 161,682-173-312-C-52
W2VUY... 137,676-154-298-B-68

CLUB SCORES

	Score	C. W. Winner	Phone Winner
Frankford Radio Club	8,722,750	W3ECR	W3DHM
Potomac Valley Radio Club	8,381,174	W3GRF	W3DHF
Northern California DX Club	2,405,829	W6KEV	W6AED
Southern California DX Club	2,218,570	K6VTQ	W6AED
Order of Billed Owls (N. Y.)	2,059,578	W2ATY	W2ATY
Connecticut Wireless Assn.	1,505,906	W1JYH	W1JYH
Ohio Valley Amateur Radio Assn.	1,379,391	W8FGX	W8FGX
Rochester DX Assn.	931,044	W2FBA	W2FBA
The DX Club of Greater St. Louis	808,069	W0RTD	W0RTD
Niagara Frontier DX Assn.	767,754	K2LWR	K2GXI
Southeastern DX Club (Ga.)	707,685	W4FJ	W4FJ
Ridgewood Amateur Radio Club (N. J.)	691,902	W2ECS	W2ECS
South Jersey Radio Assn.	682,777	K2DNA	W2ZXX
El-Ray Amateur Radio Club (Mass.)	678,660	W1OGU	W1OGU
Hamfeters Radio Club (Ill.)	668,646	W9WNV	W9WNV
The DX Club (Pa.)	608,069	W3BIP	W3BIP
South Lyme Beer, Chowder & Propagation Society (Conn.)	492,790	W1VG	W1VG
Westpark Radiops (Ohio)	464,848	W8YPT	W8ZGC
Greensboro Radio Club (N. C.)	449,838	W4PLP	W4PLP
San Diego DX Club	429,474	W6CAE	W6CAE
Catawba Valley Amateur Radio Club (N. C.)	388,530	W8ZJM	W8ZJM
Miami Valley Amateur Radio Contest Society (Ohio)	382,713	W0WFS	W0WFS
Chicago Suburban Radio Assn.	296,431	W9QYV	W9QYV
Milwaukee Radio Amateurs Club	192,084	W9QYV	W9QYV
Merrimac Valley Amateur Radio Assn. (Mass.)	172,247	K2YOR	K2YOR
Lake Success Radio Club (N. Y.)	154,584	W5OKB	W5OKB
Springfield Amateur Radio Club (Ohio)	129,606	W5OKB	W5OKB
Four Lakes Amateur Radio Club (Wis.)	128,026	W1LJO	W1LJO
Waltham Amateur Radio Assn. (Mass.)	94,113	K5PGV	K5PGV
Lafayette Amateur Radio Club (La.)	84,021	K5PGV	K5PGV
South Shore Amateur Radio Club (Que.)	73,011	W8NPF	W8NPF
Massillon Amateur Radio Club (Ohio)	51,003	K8OVR	K8OVR
Central High School (Sioux City, Iowa) Radio Club	32,645	K5EJQ	K5EJQ
Amateur Radio Club of the University of Arkansas	19,005	W8NPF	W8NPF
Sandia Base Radio Club (N. Mex.)	13,626	K8OVR	K8OVR
Five Towns Radio Club (N. Y.)	2,232	K5UYF	K5UYF

1 W3MFW, opr.

K8HTM	7440-40-62-B-35	W2AWF	137,502-417-314-BC-58
W8GMX	5814-34-67-A-	K2IRO	125,856-138-304-C-60
W8DZG	5544-33-56-B-27	W2VCB	92,544-128-241-C-42
W8AJH	4428-36-41-A-18	W2BBV	21,582-66-109-C-12
W8TPS	2940-28-35-A-6	K2YAZ	14,628-53-92-A-9
W8UEX	2574-26-35-A-6	W2IP	2100-20-35-B-18
W8CGY	2376-22-36-B-15	W2PKY	1071-17-21-A-10
K8EKG	2349-27-29-A-15	W2AFY	102-6-7-A-6
K8LPS	2340-26-30-A-		
W8NHO	2046-22-31-A-37		
W8YGR	1944-24-27-A-8	W2AYJ	652,365-327-665-C-66
K8KBE	1890-21-30-A-8	K2DGT	621,900-300-691-C-96
W8LUZ	1694-22-24-C-4	W2IRV	251,934-211-398-B-50
W8VZE	756-14-18-B-7	W2OBX	187,128-184-339-A-45
W8NNX	741-13-19-A-	K2YOR	153,576-162-316-C-
W8JAG	516-12-15-A-5	W2HML	124,620-134-310-AC-33
K8KMY	192-8-8-A-9	W2ZKQ	86,715-141-205-C-55

N. Y. C.-L. I.

HUDSON DIVISION

Eastern New York

W2HO	292,662-213-458-C-67	W2WMG	22,374-66-113-C-17
------	----------------------	-------	--------------------



LABRE's ex-president PY1ADA doesn't get a chance to relax like this during the contest, keying skillfully for 45 hours to South America's second high c.w. score with 469,854. Note the second operator in the lower center

K2VUL	16,884-67-84-B-23	K8OVR	3348-31-36-A-20
W2HQL	12,444-61-69-C-11	K0UAF	2496-29-32-A-15
W2ICQ	7749-41-63-B-11	K0UAE	75-5-5-A-6
W2NCO	7288-41-60-A-18	W0LNI (10 ops.)	2100-25-28-C--
W2BOT	6633-33-67-A-10		
W2ADES	3402-27-42-A-15		
W2LJB	2592-37-32-AB-16		
K2IVE	2574-26-35-A-5		
K2TAP	2160-20-36-B-3		
W2SNV	1369-17-26-B-20		
W2AFN	999-17-19-A-		
W2NHH	300-16-12-A-10		
W2CWD	297-9-11-A-4		
W2TUK	189-7-9-A-1		
K2IEG (W2DTJ, K2IEG)	37,392-82-152-C--		
K2OFD (W2JGU, K2OFD)	624-13-16-B-50		

Northern New Jersey

W2EQS	560,772-292-447-AC-90		
W2GCE	281,532-204-111-C-54		
W2YLS	144,096-158-304-B-63		
W2AQT	105,300-156-225-B-10		
W2CGJ	74,613-133-187-B-		
W2DRV	72,360-120-201-A-24		
W2CYS	66,340-92-240-C-32		
W2EHN	63,648-104-204-B-35		
W2CNQ	50,490-102-165-C-20		
W2DJT	41,238-87-158-A-33		
W2HUG	29,250-78-125-A-30		
W2ACBB	21,090-65-108-B-33		
K2BJA	15,219-57-89-A-20		
W2ADPT	11,613-49-79-A-15		
W2CKE	8924-46-66-A-21		
W2HTX	7524-44-57-AB-15		
K2MBX	6696-36-62-A-		
W2ADIJ	6642-41-54-A-22		
W2ASM	6653-33-47-A-		
W2CDP	3348-31-36-C-6		
W2CVW	1944-24-27-B-6		
K2EKM	1890-20-31-A-		
K2CCF	1840-23-27-A-10		
W2EDG	1764-21-28-B-6		
W2FBP	1620-18-30-A-4		
K2PIM	561-11-17-A-7		
W2ABL	192-8-8-A-2		
K2GHV (K2s GHV QDN)	282,785-205-411-C-06		
K2KFP (W2LYO, K2KFP)	236,670-230-343-B-54		
W2MDF (W2MDF, K2s QZR TJE)	55,860-95-196-AB-76		

MIDWEST DIVISION

Iowa

W0FDL	175,593-187-313-C-68		
W0HNA	82,368-132-208-C-53		
W0CXN	7440-40-62-C-		
W0BSY	7290-45-54-A-26		

Maine

W1CV	279,225-219-425-C-84		
W1EQ	234,840-190-412-C-72		
W1EF	119,232-138-288-A-38		

NEW ENGLAND DIVISION

Connecticut

W1LOP	543,444-276-657-C-71		
W1BIH	500,408-284-588-C-55		
W1VIG	405,838-262-517-C-		
W1OJR	259,290-201-430-B-63		
W1CKA	177,354-167-356-B-55		
W1TX	165,996-174-318-BC-45		
W1NI	146,782-158-311-C-51		
W1HBK	96,558-133-242-B-4		
W1TSR	85,527-129-221-B-4		
K1MLL	50,514-91-218-C-45		
W1AWA	51,168-104-164-AC-16		
W1NLM	39,093-83-157-B-50		
W1AJO	31,200-80-130-A-27		
W1WY	28,080-65-144-C-20		
W1HCP	16,200-36-160-C-		
W1OPB	9644-44-78-A-20		
W1BDP	8992-52-57-B-		
W1YZY	4374-27-54-A-9		
K1KNS	3240-30-36-B-18		
W1VQP	1425-19-25-B-4		
W1EZM	792-11-24-A-5		
K1MOT	24-2-4-A-2		

Top Canadian phone scorer is Ontario's VE3EHR, who believes in simple all band antennas for quick band hopping . . . 100,440 points makes his contention mighty convincing.

<i>East Bay</i>		W4CF	61,803-109-189- B-36
W6KG	377,541-237-531- C-02	W4WBC	59,166-114-173-BC-21
W6BSY	143,148-158-302- C-40	W4PNK	45,477- 93-163- C-20
W6PQ	76,818-118-217- C-60	K4OMR	37,248- 97-128- C-34
W6IPH	57,570-101-190- C-44	W4PHL	24,642- 74-111- B-36
W6ZSS	44,640- 93-160- A-60	W4ALJ	22,470- 70-107- B-32
W6KEK	30,456- 72-141- C- -	K4NAA	20,094- 66-102- C-20
W6GEB	24,750- 66-125- A-43	W4KMS	8,332- 48- 58- B-16
W6GGQ	67,32- 34- 66- B-30	W4AKP	6,339- 33- 64- B-10
W6FLT	57,60- 32- 60- C-12	W4HOS/4	4,512- 32- 47- B-14
K6LGH	50,40- 40- 47- C-10	K4IKF	48- 4- 4- A- 1
W6EJA	1536- 16- 32- B- -	W4KXV (W4s KXV RIM)	599,794-299-670-AC-96
W6LDD (W6s JHV LDD)	297,540-228-435- C-96	K4MJZ (K4s MJZ MXF)	83,528-128-217- C-44
W6RCC (W6s RCC TI)	150- 5- 10- C- 2	W4DVT (W4s DLA DVT)	2987- 29- 35- A- 9

<i>San Francisco</i>		<i>West Virginia</i>	
W6WB	215,340-194-370- C- -	W8UMR	45,864- 98-156- A-18
K6AP	70,308-124-189- C-88	ROCKY MOUNTAIN DIVISION	
W6MUF	54,075-103-175- C-30	<i>Colorado</i>	
W6ERS	38,715- 87-149- A-75	K6SLD	162,027-153-353- A-84
W6GQK	29,892- 79-126- C- -	W6CDP	35,532- 84-141- B-27
W6LTX	16,830- 55-102- C-22	W6TW	12,393- 51- 81- A-29
W6RZS	5394- 31- 58- B-12	<i>Utah</i>	
W6WLW	387- 9- 15- A- 8	W7BAJ	12,240- 51- 80- A-34
<i>Sacramento Valley</i>		W7POU	8550- 38- 75- A-36
W6ONZ	168,503-167-339- C-57	<i>New Mexico</i>	
W6GRX	137,700-190-308- C-62	W5FJE	121,121-143-283-AC-64
W6NRZ	92,964-127-241- C-61	W5CK	104,058-141-246- B-48
W6BLZ	74,124-116-213- C-84	K5UYF	41,481- 48- 51- B-28
W6BIL	5436- 36- 53- C- -	W5LEF	14,699- 53- 91- B-28
W6AF	3864- 28- 46- C-18	<i>Wyoming</i>	
K6CNV	1530- 15- 34- A- -	W7PQS	324,324-231-468- C-54
<i>San Joaquin Valley</i>		W7ABO	19,116- 59-108- B-35
K6RTK	77,682-121-214- C-48	SOUTHEASTERN DIVISION	
W6BYM	35,840- 80-150- C- -	<i>Alabama</i>	
W6BYH	21,735- 69-105- C-15	K4HPR/4	115,632-146-264- C-68
W6FOL	4590- 30- 51- A-13	W4KAC	54,240-120-152- C-33
K6ROU	3750- 25- 50-AB-20	K4BQU	4320- 32- 45- C-38
K6OZL	2304- 24- 32- A-15	K4KQN	3162- 31- 34- A-20
W6AFK	1536- 16- 32- A-11	<i>Eastern Florida</i>	
K6SMZ	1530- 17- 30- B-4	W4DQS	491,550-290-565- C-80
W6USV	693- 11- 21- A- 3	W4HUE	362,946-251-482- C-72
W6PMW (10 5568- 32- 58- A-90		K4TML	342,792-276-414- C-38

<i>Roanoke Division</i>		<i>North Carolina</i>	
W4PLL	331,326-237-466- C-59	W4QXB	102,168-139-145- C-34
K4QJL	180,540-177-340-BC-40	W4AHY	52,728-104-168- B-40
W4MKT	33,235- 85-131- C-25	W4MKT	33,235- 85-131- C-25
K4YEP	12,324- 52- 79- B- -	K4YEP	12,324- 52- 79- B- -
W4LYV	2418- 26- 31- C- -	W4LYV	2418- 26- 31- C- -
<i>South Carolina</i>		<i>Virginia</i>	
K4YYL	20,085- 65-103- A-31	W4YHD	773,544-334-772- C-90
K4PIA	2106- 26- 27- A- 6	W4RQR	512,451-291-587- C-65
<i>Western Florida</i>		W4KFC	436,572-288-543-AC-38
W4JAT	418,770-270-517- C-64	K4GMX	219,372-202-362- C-70
W4PRO	174,420-171-340- C-36	W4ZQR	174,420-171-340- C-36
K4ZKL	76,544-128-200- B-33	W4YWX	307,824-212-484- C-80
W4ZM	71,796- 33-193- A-23	W4CYA	277,992-234-396- B-71

<i>Eastern Massachusetts</i>		<i>Montana</i>	
W10GU	393,120-252-554-BC-76	W7JLD	2840- 20- 44- A-27
W1AQE	105,735-133-205- A-33	K7CTI	103- 5- 7- A- 2
W1LJO	77,256-111-232- A-45	<i>Oregon</i>	
K1DRX	44,832- 96-157- A-49	W7GUI	54,144- 96-188- B-32
K1DBR	33,813- 87-131- A-52	W7PLI	2970- 27- 38- A-20
W1HZ	31,827-103-103- C-14	K7AWH	1071- 17- 21- A-14
W1NS	28,952- 77-126- A-15	<i>Washington</i>	
W1CTW	17,493- 49-119- C- -	W7PQE	206,400-192-361- C-65
W1NJL	9108- 46- 66- A-20	W7DYQ	121,764-146-278- B-53
K1HRM	7749- 41- 63- A- 5	W7CMO	57,680-103-188- C-30
W1JYZ	5967- 39- 51- A-27	K7CHH	51,585- 95-181- A-41
W1PLJ	3654- 29- 42- A-20	W7CAB	17,283- 51-113- B-38
W1UQP	3552- 32- 37- B-16	W7IEU	10,800- 50- 72- B-61
K1DCB	2079- 21- 33-AB-13	K7KOP	9954- 42- 79- A-60
K1KTH	1863- 23- 27- A-20	W7JEN	8712- 44- 66- C-18
K1DSA	12- 2- 2- A- 1	K7APJ	7128- 36- 66- A-18
K1DIR (K1s CIT DIR)	100,710-135-250- B-44	W7AEA	3045- 29- 35- C-4
W1KBN (5 opns.)	53,424-106-168-AC-38	K7HFF	1938- 17- 38- A-16

<i>Western Massachusetts</i>		PACIFIC DIVISION	
W1YJH	618,696-312-661- C-70	<i>Hawaii</i>	
W1EBO	151,272-191-264- C-30	KH6DLF	90,375-125-241- C-45
W1ZD	101,748-139-244- C-32	KH6GH	59,085-101-195- A-60
W1AEW	69,520-110-212- B-69	KH6DJP	51,524- 74-142- A-36
W1DGT	10,800- 56- 72- B-16	KH6AKX	12,282- 46- 89-AB-38
W1DGL/1	3045- 29- 35- A- 1	KH6DDZ	1106- 14- 27- A-10
K1ITU	24- 2- 4- A- 2	KH6DDB	810- 10- 27- A-39
<i>New Hampshire</i>		KH6DMW	486- 9- 18- A- 6
W1IUU	352,431-229-513-AC- -	<i>Nevada</i>	
W1FZ	179,358-179-334- C- -	W7KEV	78,600-131-200- B-39
W1NHJ	64,602-111-194- B-41	W7VIU	3225- 25- 43- C- 7
W1OCV	1452- 22- 23- A-11	W7TTF	1836- 18- 34- C-16

<i>Rhode Island</i>		<i>Santa Clara Valley</i>	
W1AWE	31,356- 67-156- A-45	W6KEV	240,948-194-414- C-66
K1IFE	8322- 38- 73- B-17	W6HOC	231,762-214-361- C-50
W1RFQ	3780- 28- 45- A- 4	W6SR	207,861-193-359- C-85
<i>Vermont</i>		W6ATO	126,351-139-303- C-72
W1QMM	71,004-122-194- C-50	K6HOR	104,148-132-263-BC-47
NORTHWESTERN DIVISION		W6UUF	81,534-127-214- C- -
<i>Alaska</i>		W6FYM	46,800-160-156- C-40
KL7CDF	60,435- 85-237- C-38	W6KJ	35,124- 82-141- B-25
W7DEM	3- 1- 1- A- 1	K6UYZ	27,306- 74-123- C-32
<i>Idaho</i>		K6BWV	25,347- 71-119-AC-67
W7GXE	2691- 23- 39- B-23	W6UOV	24,840- 69-120- C-21
K7DAS	336- 7- 16- A- 8	W6QDE	14,151- 53- 89- C-18
<i>Arizona</i>		K6IEC	9471- 41- 77- A-21
W7GXE	2691- 23- 39- B-23	W6AFTA	6912- 48- 48- C-20
K7DAS	336- 7- 16- A- 8	K6BOB	1530- 15- 34- B-15
<i>California</i>		W6AHS	1122- 17- 22-AB- -

ROANOKE DIVISION		<i>North Carolina</i>	
W4PLL	331,326-237-466- C-59	W4QXB	102,168-139-145- C-34
K4QJL	180,540-177-340-BC-40	W4AHY	52,728-104-168- B-40
W4MKT	33,235- 85-131- C-25	W4MKT	33,235- 85-131- C-25
K4YEP	12,324- 52- 79- B- -	K4YEP	12,324- 52- 79- B- -
W4LYV	2418- 26- 31- C- -	W4LYV	2418- 26- 31- C- -
<i>South Carolina</i>		<i>Virginia</i>	
K4YYL	20,085- 65-103- A-31	W4YHD	773,544-334-772- C-90
K4PIA	2106- 26- 27- A- 6	W4RQR	512,451-291-587- C-65
<i>Western Florida</i>		W4KFC	436,572-288-543-AC-38
W4JAT	418,770-270-517- C-64	K4GMX	219,372-202-362- C-70
W4PRO	174,420-171-340- C-36	W4ZQR	174,420-171-340- C-36
K4ZKL	76,544-128-200- B-33	W4YWX	307,824-212-484- C-80
W4ZM	71,796- 33-193- A-23	W4CYA	277,992-234-396- B-71

Southern Rhodesia's ZE8JJ again copped the sheepskin for his country with 143,640 . . . one of the top c.w. scores from Africa. The rig is a 40 watt 807 and AR77E receiver.

QST for

W4FIJ...264,495-231-383- C-82
W4DXI...247,104-216-382-BC-74
W4MCM...99,696-134-248- B-56
K4BYD...53,424-106-168- A-27
K4TEA...45,552-104-146- A-35
W4PDP...37,674-91-138- B- -
W4JII...36,960-80-154-AB-25
W4ZKU...32,208-88-122- A-30
W4LDD...2268-27-28- A-35

SOUTHWESTERN DIVISION

Los Angeles

K6VTQ...393,066-261-502- C-72
W6TPJ...283,977-227-417- C-83
W6HJT...206,460-185-370- C-61
W6APH...79,758-126-211-BC-63
W6ID...57,300-100-191- B-27
W6FKZ...43,320-95-152- C- -
K6AGR...29,970-74-135- C-36
K6CJF...16,008-58-92- A-32
W6YVO...15,834-58-91- B-30
W6RCV...15,100-50-102- B-33
W6WDH...12,870-58-74- C-18
W6OES...10,062-43-78- A-30
W6CVY...10,011-47-71- C-12
K6OCX...7920-40-66- C-19
W6NEX...6327-37-57- B-27
W6AM...2430-27-30- C-10
K6PXC...2275-22-36- A-20
K6UPX...2079-21-33- C-11
W6AYF...2046-22-31- B-13
K6ICS...1488-16-31- A-10
W6EOL...1476-18-28- A-15
W6UFI...120-5-8- C-1
W6COT...48-4-4- C-1
K6COP...3-1-1- C- -
W6RW (5 ops.)
602,301-301-667- C-90
K6EVR (W6UED, K6EVR)
408,726-261-535- C-75
W6ANN (W6 ANN DFY)
162,024-172-314- C-59
K6KII (K6 KII OX)
160-8-8- A-3

Arizona

W7ATV...50,718-107-158- C-33
K7BWH...13,260-52-85-BC-30
W7ENA...5376-32-56- A-26

San Diego

W6CAE...118,629-147-269- C-35
W6RAN...104,676-143-244- C-49
W6CHV...90,420-137-220- B-37
K6EC...80,010-127-210- B-25
W6CQ...80,919-111-243- C-38
W6EPT...70,143-103-227- C-34
W6LRU...11,094-54-87- A-7
W6JH...5676-34-54- B-12
K6LLE...4704-28-56- A-9
W6BGF...2880-30-32-AB-13
W6WSW...429-11-13- B-34
W6YZD...297-9-11- B-4
W6GRB...198-6-11- A-3
W6WSV...128-6-7- B-8

Santa Barbara

W6ULS...184,518-153-402- C-52
W6AGO...65,688-119-184- C-25
W6GSE/6...37,146-82-151- C- -

WEST GULF DIVISION

Northern Texas

K5KBH...221,562-198-373- C-78
W5ZSX...117,810-154-255- B-60
W5QF...56,052-108-173- A-38
W5JLB...39,198-94-198- C-40
W5KLB...22,680-63-120- B-40
W5MTL...13,509-57-79- A-23
K5ATD (K5 ATD BBQ)
81,270-126-215-AC-40
K5KOR (K5 HKW KOR)
27,390-76-120-AB- -

Oklahoma

W5DQV...90,450-134-225- C-38
W5SNZ (W5SNZ, K5 QNO QNZ)
7503-41-61- A-23

Southern Texas

K5JNY...366,996-257-476- C-75
K5JZY...249,333-217-383- B-75
W5ZD...238,158-202-393-BC- -
W5PM...95,580-135-236- C-52

W5MCO...14,628-53-92- A-42
K5LGH...4080-34-40- A-11
K5LLJ...216-8-9- A-39

CANADIAN DIVISION

Maritime

VE1PQ...170,880-160-356- B-56
VE1ZZ...140,452-148-317-AB- -
VE1EK...72,450-115-210- A-39
VE1IM...51,106-101-170- B-41
VE1EF...6864-44-53- C-12
VO2NA...5985-37-53- B-40
VE1DB...2520-20-42- B-11
VO1AW...561-11-17- A-10

Quebec

VE2YU...174,303-181-321- B-60
VE2AY...112,827-143-263- A-51
VE2BV...55,080-85-234- B-18
VE2WA...45,450-101-150- B-20
VE2UN...41,400-92-150- B-31
VE2ADX...7605-39-65- B-16
VE2AEW...2700-27-34- B-20
VE2AKF...396-11-12- A-12
VE2IK...36-3-4- A-3
VE2WW (VE2 UQ WW)
482,232-284-566- B-58

Ontario

W0AII/VE3
413,181-256-538- C-54
VE3ES...106,890-130-274- A-51
VE3BOG...30,245-85-119- C-15
VE3DCI...30,015-87-115- B-30
VE3BGA...12,012-44-91- A-29
VE3DGV...9072-42-72- B-27
VE3RIT...8928-48-62-AC-36
VE3AHU...3465-33-35- B- -
VE3MZ...1512-18-28- A-6
VE3DF...102-8-8- A-5
VE3AUU...144-6-8- A-1
VE3RMC...3-1-1- A- -
VE3UOT (VE2NI, VE3CKA,
VOIDS)
92,745-135-229- C-48
VE3BWY (VE3 AYE BWY)
53,460-110-162- B-41
VE3ATZ (2 ops.)
2736-24-38- A-38

Manitoba

VE4XO...51,975-99-175- B-38
VE4SX...3871-33-39- A-12

Alberta

VE6HG...16,422-46-119- A-39
VE6HY...10,716-47-76- B-14
VE6TP...5712-34-56- B-11

British Columbia

VE7BBG...8505-35-81- A- -
VE7YE...4452-28-53- B-20

AFRICA

Canaries

EA8CG...60,396-42-481- A- -

Spanish Morocco

EA9AP...123,066-53-775- A-30

Algeria

FA3DU...9520-28-116- A-17
FA9VJ...4904-12-139- A- -

French West Africa

FF8BF...30,303-37-274- A-12

French Equatorial Africa

FQ8AF...51,870-39-459- A- -

Belgian Congo

OQ5IG...48,559-39-415- A-12
OQ5EJ...35,836-34-353- A-29

Sudan

ST2AR...271,719-57-1589- B-65

Egypt

SU1MS...15,760-20-286- A-14

Northern Rhodesia

VQ2GW...43,092-36-399- A-15
VQ2MS...17,526-23-254- A-15
VQ2W...2436-14-58- A-5
VQ2JG...1071-7-51- A-54

Tanganyika

VQ3CF...68,931-37-621- A-27



VR2DK proved mighty popular with the c.w. gang... shown here at the rig, modified BC347A and S-40A.

Kenya

VQ4FK...110,823-41-901- A- -

Nigeria

ZD2JKO...191,277-53-1203- A-49
ZD2GUP...16,941-43-129- A-5

Southern Rhodesia

ZE8JJ...143,640-45-1064- A-47
ZE2JS...117,796-49-807- A-65
ZE5JU...91,920-40-766- A-52

Union of South Africa

ZS6AOU...116,370-45-868- A-46
ZS6AVP...33,048-27-410- A-22
ZSIO...14,880-32-160- A-34

Swaziland

ZS7M...3536-13-91- A-4

ASIA

Formosa

BVIUSB...17,173-27-212- A-40
BVIUSC...3990-15-133- C- -

Saudi Arabia

HZ1HZ...97,458-37-878- A-31

Japan

JA1VX...210,273-57-1231- C-45
JA6AC...64,125-45-477- A-29
JA1YL...41,670-45-315- A- -
JA1CE...40,992-28-486- A-47
JA2JW...40,698-42-323- A-30
JA7AD...38,646-38-339- A-30
JA3IS...27,420-30-306-AB-26
JA3JM...22,170-30-247- A-20
JA1CTF...13,824-18-261- A-48
JA3BB...11,772-28-133- B-14
JA5FQ...10,500-25-125- A- -
JA7KY...7752-19-136- A-14
JA3FV...6030-15-134- A- -
JA2WB...5610-17-110- A-25
JA1BWA...4608-12-128- A- -
JA1BTG...3510-10-117- A- -
JA1AB...3471-13-90- A-9
JA1BLZ...3456-12-96- A-6
JA8LN...2520-7-120- A-24
JA1BUN...2167-11-66- A-9
JA2DN...1989-13-51-AB-6
JA2AJ...1782-9-66- A- -
JA3KM...1323-9-49- A-11
JA2AF...1316-7-64- A-9
JA3BGF...1112-8-47- A-14
JA3EK...1010-10-34- A-3
JA1DKA...576-6-32- A- -
JA1GU...294-7-14- A- -
JA1BNW...243-3-27- A- -
JA8GR...234-6-13- A- -
JA1ACA...165-5-11- A-1

JA1EL...81-3-9- A-4
JA1CQ...36-3-4- A- -
JA1DCY...24-2-4- A- -
JA6AKW...24-2-4- A- -
JA1WL...9-1-3- A- -
JA1BOK...3-1-1- A- -

Labanon

OD5LX...11,004-28-133- A-6

Asiatic Russian S.F.S.R.

UA9KZA...93,200-20-1554- A- -
UA9VB...50,868-36-471- B-50
UA9KCA...18,684-27-232- B-38
UA9GF...11,508-14-274- A- -
UA9AG...8586-18-161- B- -
UA9KPN...7248-16-151- A- -
UA9FG...3924-12-109- A-34
UA9KZB...3888-16-81- A-20
UA9KUA...3552-16-76- B-9
UA9OB...2340-13-60- A- -
UA9VC...630-9-24- A- -
UA9KKB...492-6-28- B-20
UA9KVA...180-6-10- A-3
UA9KCO (3 ops.)
121,680-40-1014- A-73
UA9KFG (5 ops.)
39,132-36-364- B-37
UA9KUV (3 ops.)
14,768-26-192- B-35
UA9KDA (2 ops.)
12,222-14-291- A- -
UA9KCA (3 ops.)
10,926-18-203- B- -
UA9KDD (3 ops.)
8772-17-172- A- -
UA9KOG (3 ops.)
8481-14-202- B- -
UA9KAC (4 ops.)
5838-14-141- B-7
UA9KAG (2 ops.)
3516-12-100- B-36
UA9KEC (2 ops.)
2688-14-64- A- -

Turkoman

UH8KAA...16,524-18-316- A-19

Uzbek

UISAD...3819-19-67- A- -

Tadzhik

UJ8KAA...3458-13-90- B-12

Kazakh

UL7HB...6912-12-192- B- -
UL7KKB (4 ops.)
4794-17-94- B-20

Hong Kong

V86AE...9328-16-196- A-18



K1DLQ, a major in the Army, put HL9KR in business in the phone contest giving a new one to many enthusiastic callers. Right: Eric inspects the shack wallpaper, and above finds HL9KR handing out coveted Korea contacts.



EUROPE		GI5UR.....39,336-44-298- A-50	
<i>Germany</i>		<i>Scotland</i>	
DL9PF.....164,958-57-966- A-54	GM3EOJ.....169,176-56-1007- A-	<i>Wales</i>	
DJ2IB.....164,528-56-983- B-43	GM8SQ.....36,024-38-316- A-	GW3JL.....299,460-60-1440- A-	
DJ1BZ.....141,474-57-833- B-66	GM3HFX.....6213-19-109- A-10	<i>Hungary</i>	
DJ2BW.....72,816-37-656- B-17	GM3UU.....4797-13-123- A-7	HA8KCU.....15,990-26-205- A-	
DJ7BQ.....44,748-44-339- A-	GM3MCH.....3780-14-90- A-4	HA5BW.....1287-13-33- A-	
DL1YA.....36,000-50-240- B-		HA5BI.....1053-9-40- A-	
DM2ATL.....9646-26-125- A-19		HA5KFR (3 ops.).....159,159-53-1004- A-	
DJ2JL.....4390-27-53- A-		HA1KSA (4 ops.).....119,901-51-786- A-	
DJ4VO.....2652-17-52- A-		HA5KQD (4 ops.).....46,560-40-388- B-	
DL9YC.....1776-16-37- A-			
DJ2AE.....96-4-8- B-		<i>Switzerland</i>	
<i>Spain</i>		HB9QO.....96,396-58-554- A-25	
EA4CE.....42,066-38-369- A-26		HB9DX.....66,234-39-581- A-	
EA1CP.....18,875-25-249- B-12		HB9UD.....1365-13-35- A-26	
EA3KT.....15,471-27-191- A-18		HB9NL.....962-13-25- A-	
EA5FU.....3069-11-93- A-			
EA3CK.....1950-10-65- A-		<i>Italy</i>	
<i>Ireland</i>		IT1AGA.....66,384-48-465- A-47	
E18D.....184,965-57-1084- A-58		I1BLF.....55,836-36-517- A-33	
E1BJ.....165,924-66-835- A-22		I1ZCN.....46,284-38-407- A-35	
E1SG.....4494-21-73- A-6		I1ER.....18,865-35-183- A-21	
E15F.....3402-14-81- A-		I1BCB.....7176-24-102- A-14	
<i>France</i>		<i>Norway</i>	
F8VJ.....205,326-66-1039- A-42		LA9AF.....39,804-31-428- A-37	
F8ZF.....150,252-57-894- A-70		LA10A.....32,832-38-288- A-31	
F8TQ.....62,448-49-134- A-30		LA6U.....17,228-27-215- A-	
F8TM.....35,532-42-282- A-28		LA6UB.....17,019-31-183- A-16	
F9BB.....17,160-26-220- A-12		LA3HA.....8759-23-127- A-	
F2SQ.....14,145-23-205- A-30		LA2Q.....504-7-24- A-	
F9DW.....7020-26-90- A-7		LA3MD.....105-7-5- A-	
F8VO.....4550-13-117- A-		LA1AD (4 ops.).....69,075-45-520- A-96	
F2GO.....4270-14-104- A-		<i>Austria</i>	
F3H.....3735-15-85- A-		OE1RZ.....208,919-59-1181- B-70	
F2NZ.....549-9-21- A-		OE3RE.....131,835-55-799- A-	
<i>England</i>		<i>Finland</i>	
G4CP.....394,200-75-1752- A-72		OH2LA.....63,008-32-658- A-	
G2QT.....210,447-67-1047- A-62		OH8PX.....24,331-29-282- A-	
G8GQ.....184,680-60-1026- A-52		OH9PF.....17,193-33-174- A-	
G2DC.....179,970-70-857- A-		OH3TE.....14,000-25-187- A-	
G3EYN.....57,816-44-438- A-		OH4OW.....4416-16-92- A-	
G3APN.....42,111-43-326- A-60		OH2PM.....1650-15-37- A-	
G3GJW.....41,696-32-436- A-6		OH2QV.....1330-14-32- A-1	
G2RO.....38,337-39-331- A-26		OH2PT.....36-3-4- A-1	
G3WP.....810-9-30- A-6		OH2PS.....12-2-2- A-	
G3IEW (6 ops.).....186,921-63-989- A-71		OH5PG.....3-1-1- A-	
G5RP (G2DU, G5RP).....71,232-53-450- A-76		OH2AA (OH2m KH KK LP).....13,320-30-148- A-35	
G3JUL (G3s JUL LGA).....41,052-44-311- A-28			
<i>Channel Islands</i>			
GC2FZC.....30,600-34-300- A-21			
<i>Northern Ireland</i>			
GI3JXS.....76,032-44-576- A-48			

Czechoslovakia		SL5AX (SM2COL, SM4AFJ)	
<i>Poland</i>		<i>Poland</i>	
OK1ZL.....117,282-66-607- B-61		SP6FZ.....116,052-49-784- B-55	
OK1JX.....61,560-54-383- C-28		SP8HR.....20,384-32-215- A-24	
OK3KFE.....61,560-40-513- A-		SP8MJ.....20,268-36-188- A-32	
OK1RX.....45,320-40-380- A-		SP6AAT.....14,420-35-138- A-22	
OK3EA.....44,451-33-453- A-		SP6YL.....11,200-28-134- A-12	
OK1AWJ.....28,107-27-349- A-		SP6YC.....9240-22-140- A-22	
OK1KVV.....26,080-40-219- A-21		SP6KBE.....6000-20-100- A-4	
OK1BMW.....16,352-32-172- A-28		SP6DN.....4318-17-85- A-56	
OK2KFP.....7760-16-162- A-		SP6XA.....2808-18-52- A-26	
OK2QR.....5733-21-91- A-		SP6LB.....2223-19-39- A-10	
OK1LM.....4914-14-119- A-		SP8HU.....1664-13-43- A-	
OK1WD.....4914-14-119- A-		SP3HD.....592-8-25- B-	
OK2AJ.....4190-10-141- A-14			
OK1KSO.....3066-21-49- A-		<i>Iceland</i>	
OK1BI.....2784-16-58- A-		TF3MB.....50,727-37-457- A-34	
OK1AEH.....1521-13-39- A-		TF2WEN.....48,050-31-519- A-22	
OK1ZW.....1104-12-31- A-		TF3AB.....37,278-38-327- A-	
OK2KAU.....546-6-30- A-		TF2WEZ.....14,628-23-212- A-	
OK1NK.....36-3-4- A-1			
<i>Belgium</i>		<i>European Russian S.F.S.R.</i>	
ON4LX.....237,850-67-1184- A-52		UA1TQ.....33,120-30-368- B-	
ON4GL.....161,510-62-871- A-36		UA1CC.....6486-23-94- B-	
ON4WE.....9170-14-219- A-12		UA1KAS.....5580-15-124- B-	
<i>Fuores</i>		UA3TI.....2828-14-68- A-10	
OY7ML.....644-7-31- A-		UA1FL.....2484-16-52- A-	
<i>Denmark</i>		UA4KWV.....1728-16-36- B-54	
OZ1W.....207,552-64-1092- A-74		UA3TV.....1620-15-36- B-	
OZ7G.....99,792-54-619- A-64		UA3RM.....1287-13-35- B-	
OZ3SN.....45,630-39-390- A-		UA1UK.....891-11-27- A-	
OZ3P.....38,124-36-353- A-		UA3YR.....504-12-14- A-10	
OZ7BZ.....20,121-19-354- B-		UA3TA.....18-2-3- A-	
OZ6RL.....9522-23-138- A-14		UA3KWA (multiop.).....43,365-35-113- B-96	
OZ7BQ.....6138-22-94- A-		UA1KAG (3 ops.).....27,318-29-314- A-	
OZ2NU.....1260-15-28- A-12		UA3KMB (3 ops.).....9639-23-132- AB-16	
OZ8LD.....774-9-29- A-		UA1KAG (3 ops.).....4032-14-96- A-	
OZ5JT.....336-8-14- A-		UA3KOE (2 ops.).....1910-10-64- A-	
OZ5DX.....165-5-11- A-		UA4KSA (3 ops.).....1133-11-35- A-8	
<i>Netherlands</i>		UA3KYA (3 ops.).....56-4-5- A-	
PA0VB.....151,104-64-787- A-			
PA0LU.....51,246-39-438- A-20		<i>Ukraine</i>	
PA0YN.....38,295-37-345- A-29		UB5WF.....388,734-67-1940- B-	
PA0LOU.....32,844-42-262- A-14		UB5KB.....8832-23-128- A-35	
PA0ATY.....22,960-20-285- A-35		UB5EF.....8450-25-116- A-11	
PA0QM.....20,125-35-194- A-24		UB5QF.....5985-21-95- B-	
PA0WAC.....11,868-23-172- A-23		UB5JAF.....3792-16-18- A-24	
PA0NIC.....1485-9-55- A-		UB5KEP.....1632-16-34- B-	
PA0PT.....18-2-3- A-		UB5KAD (3 ops.).....98,176-47-697- B-77	
<i>Sweden</i>		UB5KFF (3 ops.).....95,040-40-542- A-43	
SM5BLA.....78,045-43-605- B-		UB5KAU (3 ops.).....930-10-31- A-	
SM5CCE.....65,616-48-456- B-20			
SM5ARE.....44,733-31-481- A-			
SM5ATK.....36,964-22-559- B-			
SM5UU.....23,868-36-221- B-			
SM7EH.....4410-15-98- A-8			
SM5TW.....3960-15-88- A-			
SM5VE.....3024-21-46- A-12			
SM7AFA.....2925-13-75- A-6			
SM5AHJ.....234-6-13- A-			

UB5KBG (2 opns.)
891- 11- 27-A -

White Russian S.S.R.
UC2AA... 152,163- 53-964- B-37
UC2KAA (2 opns.)
17,875- 25-243- A-21
UC2KAB (3 opns.)
5508- 17-108- B-33

Azerbaijan
UD6AM... 11,418- 22-175- A-35
UD6KAB... 8370- 18-155- B-33
UD6KEA... 210- 5- 14- A -

Georgia
UF6FB... 4824- 13- 16- A -
UF6PB... 3399- 11-103- A -
UF6KAF (3 opns.)
103-A - 61,425- 35-585- B-72
UF6KPA (3 opns.)
3708- 12-103- A -

Armenia
UG6AW... 15,312- 22-236-AB-
UG6KAA... 5355- 15-119- A -
UG6LA... 1375- 11- 45- B -

Lithuania
UP2AC... 10,764- 23-156- B -
UP2KBC (UP2a KBC ND NP)
3600- 16- 75- B-24

Latvia
UQ2KAA... 8463- 21-137-AB-
UQ2BP... 4080- 17- 80- A-10

Estonia
UR2KAE... 37,555- 20-443- B -
Roumania
Y03FD... 11,118- 17-218- A -
Y06KBA... 9144- 24-127- A -
Y03AC... 342- 6- 19- A -

Yugoslavia
YU1YE... 24,174- 34-240- A-15

NORTH AMERICA

Cuba
CO7PG... 42,744- 30-367- A-12
CM8RM... 25,760- 14-630- A -
CO8EM... 2925- 15- 65- A -3

Guadeloupe
FG7XF... 57,660- 31-620- A -
San Andres and Providencia
HK0AI... 147,000- 50-980- B -

Panama
HP1AC... 180- 6- 10- A -

Greenland
KG1BX¹... 25,380- 36-235- B-7

Guantanamo Bay
KG4AP... 7140- 17-140- A-7

Puerto Rico
KP4AOO... 701,136- 81-2886- A-75
KP4CC... 485,292- 74-2186- B-65

Swan
KS4AZ (W4s JNE KFC, KS4AZ)
518,568- 68-2542-AB-42

Virgin Islands
KV4CG... 28,204- 22-429- A -

Canal Zone
KZ5TD... 457,650- 75-2034- A-58
KZ5LC... 310,824- 72-1439- A -

British Honduras
VP1JH¹... 1,377,918-114-1037-AB-86

Turks and Caicos
VP5ME... 575,343- 81-2393- A-51

Barbados
VP6AF... 58,050- 50-387- A-28
VP6YB (W8t UO VPC)
11,609- 13-300- B-7

Bahamas
VP7NT... 525,063- 77-2273- A-53

Bermuda
VP9EO... 204,300- 60-1135- A-37

Mexico
XE1PJ... 102,186- 42-811- A-17
XE1POE... 11,004- 28-131- A-15

Nicaragua
YN4AB... 63,288- 27-782- A-65

OCEANIA

Philippines
DU7SV... 119,760- 48-865- B -

New Caledonia
FK8AH... 107,484- 53-679- A -

Marianas
KG6FAE (4 opns.)
337,392- 66-1704- C-91

Midway
KM6BQ... 146,205- 45-1083- A-28

Wake Island
KW6CQ¹⁵... 7394- 21-118- A-6

Australia
VK2GW... 341,670- 70-1627- A-65
VK3MR... 118,332- 57-692- A -
VK2VN... 36,846- 46-267- A-8
VK2AB... 16,182- 31-174- A-12
VK3RJ... 17,736- 24-183- A -
VK4XW... 9015- 15-201- A-23
VK3ARX... 7442- 23-108- A-9
VK5JT... 7429- 19-131- A -
VK3HL... 5460- 20- 91- A-8

Fiji Islands
VR2DK... 62,155- 31-673- A-37

New Zealand
ZL1MQ... 287,763- 71-1351- A-13
ZL2PM... 62,178- 43-482- A-21
ZL1AFW... 290,070- 34-285- A-15
ZL3AM... 25,825- 25-345- A -

SOUTH AMERICA

Chile
CE3AG... 374,070-174-1685-AC-42
CE1AD... 260,208- 52-1668- B-40
CE3LV... 53,724- 44-407- B -

Bolivia
CP3CD... 5228- 13-134- A -

Uruguay
CX2AZ (CX2AZ, CX7CO,
CX9AJ) 295,920- 60-1644- A -

Ecuador
HC2IU... 181,720- 56-1083- A-58

Colombia
HK3TH... 100,132- 37-812- B -

Venezuela
PY1ADA... 469,854- 77-2034- B-45
PY15TH... 41,667- 43-323- B-18
PY1VBR... 15,540- 14-372- A-10
PY4AXN... 963- 9- 36- B-15

Paraguay
ZP9AY... 216,540- 60-1211- A-70

¹ W3MFW, opr. ² W3WJD, opr. ³ Hq. staff — not eligible for award. ⁴ W1WPR, opr. ⁵ K4MXF, opr. ⁶ K5ABV, opr. ⁷ W2LHL, opr. ⁸ VE2AGM, opr. ⁹ VE3CQH, opr. ¹⁰ OK3WX, ¹¹ OK1AAU, opr. ¹² SP6RT, opr. ¹³ W9EHR, opr. ¹⁴ W9NWX, opr. ¹⁵ K6QPG, opr.

PHONE SCORES

ATLANTIC DIVISION

Eastern Pennsylvania
W3DHM... 318,150-210-505- C-82
W3ALB... 222,855-179-415- C-70
W3ECR... 117,747-147-267- C-39
W3KT... 82,320-112-245- C -
W3IMV... 65,205-105-207- B-32
W3EQA... 56,964-101-188- C-40
W3EAN... 37,179- 81-153- C-22
W3ZSS... 32,076- 81-132- C-37
W3MQC... 29,580- 68-145- C-27
W3GHS... 20,340- 60-113- B-12
K3JRK... 13,260- 52- 85- C-18
W3ORU... 7790- 41- 64- B-10
W3MWC... 7573- 47- 55- A-20
W3LEZ... 7011- 41- 57- A-15
W3PHL... 6630- 34- 65- C-28
W3GHH... 6048- 36- 56- B-7
W3CAA... 5880- 35- 56- A-17
W3GHD... 4950- 33- 50- B -
W3AEM... 432- 12- 12- B-6
W3GMC... 363- 11- 11- A -
W3KFK (W3s KFK QKV)
145,080-155-312- C-80

Western New York
K2GXI... 180,363-177-341- C-78
W2PUN... 118,008-19-264- B-48
W2SNI... 16,520- 59- 94- B-33
W2VUF... 11,616- 56- 71- B-25
W2VUH... 7985- 45- 59- B-20
W2TQH... 7611- 43- 50- A -
K2UNY... 6270- 38- 35- A-12
W2QWS... 4554- 33- 46- C-25
W2ACJO... 1326- 17- 26- A -
K2JTM... 585- 13- 15- B-4
W2MYN... 90- 5- 6- A-3
K2SXX... 12- 2- 2- A-1

Western Pennsylvania
W3MBN... 10,800- 50- 62- C-12
W3ROA... 8448- 44- 04- A -

CENTRAL DIVISION

Illinois
W9NZM... 159,720-165-331- C-70
W9WNV... 32,310- 81-133-AC-26
K9BGL... 29,250- 78-125- A-68
W9PVA... 22,713- 67-113- B-32
W9WJV... 20,790- 70- 98- C-37
W9IVG... 16,632- 63- 88- C-26
W9GAI... 7755- 47- 55- A-38
W9PNE... 1932- 23- 28- A-13
W9QLD... 882- 14- 21- B-7
K9OSG... 864- 16- 18- A-6
W9VTV... 645- 15- 15- C-26
K9ORC... 363- 11- 11- A-12
W9LNQ... 200- 10- 40- A-4
K9OCU... 147- 7- 7- A-3

Mad.-Del.-D. C.
W3AYD... 48,654-102-159-AB-
W3DRD... 35,340- 95-124- B-29
W3IYE... 32,256- 84-128- C-37
W3NNX... 990- 18- 19- A-5
W3ML... 240- 8- 10- C-5
W3BVO... 90- 5- 6- B -
W3GRF (W3s FYH GRF,
W6HOH) 123,924-138-300- C-40
W3GGF (7 opns.)
23,506- 73-108-ABC-27

Southern New Jersey
W2ZX... 132,800-160-278- C -
W2DMR... 44,814- 97-154- C-49
W2QKJ... 10,074- 46- 73- B-40
W2SDB... 7866- 46- 57- C-19
W2SRP... 5832- 36- 54- A-35
W2ESG... 5632- 32- 60- B-12
K2HBY... 2300- 25- 44- A-21
K2MBT... 2232- 24- 31- C-6
K2UTR... 1440- 16- 30- A-16
K2AIM... 780- 13- 20- B -
K2BQW... 767- 12- 20- B-23
W2SDO... 765- 15- 17- B-12
K2YEL... 429- 11- 13-AC-12
K2OEA... 300- 10- 10- A-4
W2REB... 180- 6- 10- B-5
K2MPV... 108- 4- 9- B-3
W2ADA... 75- 5- 5- A-4

Indiana
K9CUY... 71,645-115-216-AB-70
W9YSQ... 41,631- 97-141-AC-29
K9ECE... 13,944- 56- 63- A-43
W9TEV... 4080- 34- 40- B-15
W9GUX... 1800- 20- 32- B-26
W9UEM... 663- 13- 17- A-5
W9TUD... 144- 6- 8- C -

Wisconsin
W9EWC... 216,656-176-411- C-72
W9BCV... 27,015- 67-115- B-26
W9MBF... 26,676- 78-114- B-30
W9RLJ... 12,312- 54- 76- C-27
W9NLJ... 2250- 25- 30- A-8
W9QYV... 1500- 20- 25- B-8
W9SFK... 882- 14- 21- C -
K9ABP... 432- 12- 12- A-4



T12RO lived things up from Costa Rica in the phone section scoring 119,534 with this TBS rig and SX-71 inhaler.

K9ENB.....216- 8- 9- B- 3

DAKOTA DIVISION

North Dakota

W9JWL.....9114- 49- 62-AB-30

Minnesota

W0EKS.....7776- 48- 54- B-27
W0VAF.....7020- 39- 60- B-26
K90BP.....3483- 27- 43- A-16
W0VIP.....2484- 23- 36- B- 9
K9PAU.....192- 8- 8- A-11

DELTA DIVISION

Arkansas

K5COE.....3960- 51- 66- A-30
K5EJP.....147- 7- 7- C- 3
K5LIX.....12- 2- 2- A- 3

Louisiana

W5KC.....34,425- 85-135-AC-10
K5TTA.....2592- 27- 32- A- 9

Mississippi

K5LYC.....507- 13- 13- B- 4

Tennessee

K4LPW.....84,216-121-232- B-50
W4ODR (6 ops.).....14,151- 53- 89- C-58

GREAT LAKES DIVISION

Kentucky

W4NWT.....33,375- 89-125- A-48
W4EPD.....2450- 25- 33- A-19

Michigan

W8WT.....36,354- 83-146- A-40
K8JOE.....4176- 29- 48- A-30
K8OWR.....3552- 32- 37- A-12
K8JCB.....2418- 26- 31- B-27
K8CFC.....2352- 28- 28- C-12
K8OEZ.....1944- 24- 27- A- 6
W8LUP.....1134- 14- 27- C- 8
W8NWO (W88 NWO TWA)
W8NGO (4 ops.).....238,572-188-423- B-90

Ohio

W8NXP.....151,662-157-322- B-63
W8ZOK.....134,505-147-305- B-60
W8BMX.....24,832- 76-109-AC-50
W8NCV.....24,840- 72-115- B-50
W8ZCC.....15,163- 59- 67- B-23
W8SMQ.....7425- 45- 55- B-17
W8PJN.....5565- 35- 33- B-20
W8CMK.....3861- 33- 39- A-15
W8NHO.....3696- 28- 44- A- 8
W8MWE.....2925- 25- 39- A- 7
W8AJH.....2775- 25- 37- B-11
W8YPT.....2475- 25- 33- A-10
W8NNX.....2331- 21- 37- A- 9
K8UTM.....1702- 23- 25- A-26
W8DZG.....1674- 18- 31- A-18
W8NDJ.....975- 15- 22- A-17
W8YUS.....756- 14- 17- B-10
W8EPB.....675- 15- 15- C- 5
K8KBE.....672- 14- 16- A- 9
K8DEO.....546- 13- 14- B- 5
K8IPD.....496- 11- 15- A-10
K8IPS.....36- 3- 4- A- 3

HUDSON DIVISION

Eastern New York

W2VRE.....27,156- 73-124- B-31
W2GBC.....22,685- 65-117- C-22
W2DVC.....14,557- 61- 79- C-30
K2UTL.....2880- 24- 40- A- 8
K2YAZ.....2592- 24- 36- A-10

N. Y. C. L. I.

K2DXT.....118,503-133-297-AC-50
K2UGT.....11,250- 45- 88- A-26
K2KHR.....3510- 26- 45- A-10
W2WMG.....2001- 23- 29-BC-10
K2YOR.....330- 10- 11-BC- 4
W2TUK.....192- 8- 8-AC- 1
K2DIL.....60- 4- 5- B- 2
K2DEM.....36- 3- 4- C- 1
K2VBJ.....12- 2- 2- B- 1
K2AIR (4 ops.).....40,185- 95-141-AC-85

Northern New Jersey

W2BTJ.....39,216- 83-152- B-40
W2DJT.....16,665- 55-101- A-39
K2HLC.....13,818- 49- 94- A-35
W2FTQ.....12,654- 49- 82- B-44
W2QXQ.....3192- 28- 38- A- 9
K2UFM.....2277- 23- 33- B- 9
K2RBD.....1890- 20- 31- A-17
K2RGS.....363- 11- 11- A- 5
W2GBV.....154- 7- 8- A-10
W2EQS.....27- 3- 3- C- 9

MIDWEST DIVISION

Iowa

K9LFA.....6680- 36- 60- B-48
W9FDL.....2001- 23- 29- C- 6
W9DSP.....675- 15- 15- C- 8
K9LPI.....243- 9- 9- A- 7

Kansas

K9PIE.....33,768- 84-134- B-42
K9GVO.....2128- 28- 28- B-60
W9VFE.....1650- 22- 25- A- 6

Missouri

K9LFY.....48,000-100-160- A- 9
W9LBB.....27,844- 83-108- C-45
W9BTD.....14,976- 64- 78- A-30
W9MCX.....6690- 39- 57- B-40
K9RAL.....1449- 21- 23- B- 6
K9WQZ.....819- 13- 21- B- 3

NEW ENGLAND DIVISION

Connecticut

W1OKG.....52,920-105-168- C-45
W1BHI.....37,557-107-117-AB-20
W1AW7.....15,690- 52-100-AC-20
K1DIR.....6865- 27- 85- C- 2
W1OJR.....9536- 43- 52- A-20
W1DGI.....2160- 24- 30- A- 9
W1VIC.....363- 11- 11- B- 8
W1ETF (W1ETF, K1s ANVHT)
.....157,035-145-361- C-85

Maine

W1DIS.....51,870- 95-182- C-36
W1COP.....6120- 40- 51- B-13

Eastern Massachusetts

W1ONK.....423,990-210-673-ABC-86
K1JTC.....136,456-148-316- C-59
K1DIR.....18,113- 59-103- B-26
W1OJU.....8418- 49- 61- B- 9
W1AOL.....6884- 44- 52- B-10
K1MAD.....5928- 38- 52- B-30
W1SHG.....5920- 32- 63- A-24
W1WRU.....1566- 18- 29- B-11
W1UQP.....946- 13- 14- A-12
W1BB.....106- 6- 6- A- 4
K1DCB.....90- 6- 6- B- 2
W1NJL.....60- 4- 5- A-10

Western Massachusetts

W1AUF.....110,544-141-264- B-55
W1ILB.....22,320- 60-126- A-20
W1IRF.....16,317- 49-113- A-20
K1CPD.....10,045- 49- 70- A-11

New Hampshire

W1FZ.....134,332-142-316- C- 9
W1KVG.....6615- 45- 49- B-21
W1IUU.....714- 14- 17- A- 9

Rhode Island

W1PDF.....266,994-163-546- C-75
W1PPN.....8064- 42- 64- A-12
W1SIE.....1140- 19- 29- C-14
W1LWB.....840- 14- 20- A- 9
W1QCO.....840- 14- 20- C- 9

Vermont

W1IMK.....2664- 24- 37- A-18

NORTHWESTERN DIVISION

Alaska

KL7CDF.....17,802- 43-138-BC-11

Montana

W7CBY.....7956- 39- 68- B-36
W7FIN.....4536- 27- 56- A-36
W7HLH.....1242- 18- 23- A-24

Oregon

W7HXG.....3596- 29- 42- C- 7
W7EUD.....2583- 21- 41- C-30
K7AWH.....240- 8- 10- A-12

Washington

W7PQE.....6634- 31- 72- A-22
W7UWT.....4448- 32- 47- A-14
W7JEN.....1125- 15- 25- C- 8
K7HPF.....120- 5- 8- A-10

PACIFIC DIVISION

Hawaii

KH8CJJ.....6789- 31- 73- A-20
KH8DLF.....819- 13- 31- C- 9
KH8DJP.....546- 13- 14- A- 5
KH8CTH.....3- 1- 1- A- 1

Nevada

W7VIU.....90- 5- 6- C- 1

Santa Clara Valley

K6ERV.....12,100- 50- 81- B-36
K6LXV.....8436- 37- 76- B- 9
W6TXA.....2736- 19- 48- B-20
K6BOB.....135- 5- 9- B- 4
W6HRS.....60- 4- 5- A- 9

East Bay

W6LDD.....47,709- 93-171- C-72
W6BSY.....9417- 43- 73- B-20
W6VNH.....8436- 38- 74- A-30
W6DFR.....3564- 27- 44- C-18
W6KG.....810- 15- 18- C- 5
W6KEK.....324- 9- 12- C- 9
W6MMH.....54- 3- 6- A- 4

San Francisco

K6OHJ.....22,680- 60-126- C-48
W6YEJ.....3915- 29- 45- A-48
W6ZKM.....2280- 20- 38- A-30
W6GGK.....765- 15- 17- B- 9

Sacramento Valley

W6AED.....70,560-112-210- C-59
W6EJC.....36,162- 82-147- A-48
W6GVM.....25,920- 72-120-AC- 9
W6SIA.....13,515- 53- 83- C-19
W6GRX.....1425- 19- 25- C-17

San Joaquin Valley

W6BVM.....1820- 20- 31- C- 9
W6TKF.....1785- 21- 29- A- 6
W6FOL.....1350- 15- 30- A- 8
W6USV.....180- 6- 10- A- 2

ROANOKE DIVISION

North Carolina

K4QJL.....105,276-124-283-BC-42
K4ZCP.....102,714-114-303-AB-49
W4GXB.....12,354- 58- 71- C-23
K4VNY.....200- 8- 9- B-10

South Carolina

K4HHL.....27,396- 82-111- B-21
K4YLL.....720- 12- 20- A- 7

Virginia

W4ZM.....576- 12- 16- A- 3
K4IYE.....429- 11- 13- B- 4

West Virginia

W8UMR.....10,950- 50- 73- A-14

ROCKY MOUNTAIN DIVISION

Colorado

W0GAA.....47,628- 98-162- B-62
K0SLD.....4554- 33- 46- A-11
W0CDP.....612- 12- 17- B- 7

New Mexico

K5UYF.....11,475- 51- 75- B-40
W5LEF.....1827- 21- 29- B-11
W5ONK.....324- 9- 12- B-12

SOUTHEASTERN DIVISION

Alabama

W4KAC.....11,832- 58- 68- C-26
K4KQN.....8236- 46- 61- A-28
K4LPP.....779- 9- 11- A- 6

Eastern Florida

W4USQ.....88,365-137-215- A-62
K4CTU.....42,000-100-140- B-18
K4SUU.....17,955- 63-100- A-42
K4LWI.....5922- 42- 47-AC-11
W4NYF.....3045- 29- 35- C-17
W4EEO.....583- 13- 15- B- 9

Georgia

W4PDP.....21,756- 74- 98- A-31
K4HMX.....17,955- 63-100- A-42
K4BVD.....1122- 17- 22- A- 7
W4ABZ (4 ops.).....855- 15- 19- A-31

SOUTHWESTERN DIVISION

Los Angeles

W6MVK.....29,988- 68-147- C-29
K6LGF.....3276- 26- 42- C- 9
K6UFY.....2185- 19- 39- C-12
K6ICS.....1377- 17- 27- A- 9

Arizona

W7ENA.....960- 16- 20- A- 9

San Diego

W6RCD.....11,890- 55- 72- C-23
W6CHV.....4095- 35- 39- B-16
K6LLE.....1512- 18- 28- A- 5

Santa Barbara

W6AGO.....8883- 47- 63- C-11
W5JRE/6.....2016- 21- 32- B- 9

WEST GULF DIVISION

Northern Texas

K5KOR.....5742- 33- 58- A-30
W5MOY.....429- 11- 13- A-12

Oklahoma

W5ALB.....38,885- 17-169- B-47
W5ZZI.....765- 15- 17- A-18

Southern Texas

K5RQI.....4455- 33- 45- A-29

CANADIAN DIVISION

Maritime

VE1PQ.....37,380- 89-140- B-32
VE1IM.....26,196- 74-118- B-32
VO2NA.....3388- 28- 41- B-30
VE1AL.....1170- 14- 30- A- 5

Quebec

VE2ACU.....56,753-103-185- A-45
VE2CB.....54,720- 96-194- A-46
VE2AFK.....13,305- 47- 95- B-22
VE2IK.....7560- 45- 56- A- 9
VE2PD.....390- 11- 13- A- 5
VE2UN.....243- 9- 9- A- 5

Ontario

VE3EHR.....100,440-135-248- B-76
VE3PV.....63,504-108-196- A-56
VE3PE.....39,858- 91-146- A-48
VE3BGA.....9900- 45- 74- A-27
VE3BDB.....3132- 29- 36- B-10
VE3DCI.....1518- 22- 23- B-14
VE3ES.....1296- 18- 24- A- 8
VE3BOB.....812- 14- 20- B- 3
VE3CAA.....429- 11- 13- A-12
VE3AAU.....360- 10- 12- A- 1
VE3CKW.....240- 7- 8- A- 4

Manitoba

VE4SD.....28,575- 75-127- A-40
VE4RP.....3612- 28- 43- B-17
VE4XO.....3564- 33- 38- B-15

Saskatchewan

VE3RU.....70,446-118-199- A-63
VE3CX.....17,820- 54-112- A-30
VE3QC.....9360- 48- 65- A-35

Alberta

VE6TP.....18,585- 50-105- B-17
VE6RP.....17,225- 53-109- B-24
VE6SF.....10,948- 46- 83- A-22
VE6IN.....3432- 26- 44- A-25
VE6HG.....2139- 23- 31- A-12

British Columbia

VE7CE.....7434- 42- 59- B-15
VE7BBU.....3630- 22- 53- A- 9

(Continued on page 154)



NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

HIS 'N' HER RIGS

IF you read "It Seems to Us," August 1960 *QST*, then you have probably already done your rejoicing over the official new policy of the FCC pertaining to which call to sign in a family where two or more amateurs use one set of equipment. As stated editorially, "Happily the official view coincides with what has become a fairly widespread practice." All YLs/XYLs would do well to have the following FCC ruling in mind for immediate reference:

"Where more than one amateur station license and call sign has been issued for the same location, it is permissible to operate a single combination of transmitting and receiving equipment under each license, provided that each station licensee has full control of the station at all times during which his license and call sign are being used. In such circumstances, separate station logs should be maintained and each licensee will be held responsible for all operation under his license and call sign."

In the past a number of YLs have interpreted previous FCC rules on which call to sign to conclude that since it was the OM's rig they were using, it was necessary to sign his call at all times. This interpretation, while understandable on one hand, often created a problem of identification of the YL involved. Verification of YL QSOs by contest log-checkers and certificate custodians has been sometimes very confusing to say the least.

So with thanks to the FCC and apologies to the editor for the twist: "In other words, now it's official — Dad and Junior can use Mom's rig, using their own calls and their own log books."

21ST YLRL ANNIVERSARY PARTY

YLRL Vice President Lillian Beebe, W5EGD/3, urges all YLs who plan to participate in the Anniversary Party to read the rules very carefully before starting the contest, as there are some changes this year. Some of the comments concerning this year's AP, forwarded by the Vice President, are here summarized with the hope of making the 1960 Party more enjoyable to an expected record turnout of YLs.

The contest dates are earlier this year in order to give you time to participate wholeheartedly in the AP then rest up for Sweepstakes and some of the other contests in November. Although it is perhaps a hardship on YLs who work, the contest is again scheduled for weekdays. YLs at home should bear this fact in mind and operate during evening hours as much as possible.

In the past there have been many discussions on the

merits of a 24-hour vs. a 36-hour AP. Considered too long a period by most, the 36-hour contest has been changed to a 30-hour contest, with the hope that this will be the best solution for both U. S. and DX YLs. (Any portion of the 30-hour period may be worked — 30 hours, 15 hours, 1 hour.)

The c.w. section is being held first this year. Don't be afraid of this portion of the party, even though you may not be exactly an A-1 c.w. operator. The stations you work will slow down to your speed, for they will be delighted to get your contact and happy that you are at least making an effort at c.w. operation.

ARRL sections are again used in scoring this year. A combined c.w. and phone score is required for the Corcoran Award, and the award will be given to a YLRL member only. Logs must be complete in every detail. Be sure you receive the correct exchange from stations worked. Logging incorrect or insufficient information may mean the difference between losing or winning. Decisions of the Vice President will be final.

Have fun and lots of it!

21ST YLRL ANNIVERSARY PARTY

CONTEST PERIOD

C.W. —
Starts: Wednesday, Oct. 19, 1960, 12 noon EST
Ends: Thursday, Oct. 20, 1960, 6:00 P.M. EST
PHONE —
Starts: Wednesday, Nov. 2, 1960, 12 noon EST
Ends: Thursday, Nov. 3, 1960, 6:00 P.M. EST

ELIGIBILITY: All licensed YL and XYL operators throughout the world are invited to participate. YLRL members are eligible for cup awards; non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OM's will not count. A special certificate will be given to the highest scoring novice operator and to the highest scoring technician operator.

OPERATION: All hands may be used. Cross-band operation is not permitted. Only one contact with each station will be counted in each contest.

PROCEDURE: Call "CQ YLAP".

EXCHANGE: Station worked, QSO number, RS or RST



*YL Editor, *QST*: Please send all news notes to W1QON's home address: 318 Fisher St., Walpole, Mass.



The current President of the Ladies Amateur Radio Klub of Chicago, Roberta Kroulik, K9IVG, is a Registered Nurse and the wife of a surgeon, who is not yet a ham. Forty meters is Roberta's favorite band.



HR2RH, Rosa Hepburn, of Cortes, Honduras operates 20, 15, and 10 meters using a B & W 5100B transmitter and an HQ-150 receiver. The 20-year-old amateur is the only YL in her country. (Photo via W8QHW)



Six young ladies—all 12 years old, all Girl Scouts, and all hams! The YLs from Port Monmouth, N. J. became interested in ham radio when they were working for the Scout radio-television badge. Taught code and theory by K2STE, OM of troop-leader, Mrs. James Froelich, the girls are continuing studies for General Class licenses. Left to right: Kathy Froelich, WV2JUR, Nancy Kroner, WV2JUP, Sue Fabian, WV2JUO, Nancy Jorgenson, WV2JUL, Chris Trautvetter, WV2JUN, and Joyce Malone, WV2JUQ.



Mr. and Mrs. Tex DeBardeleben, newlyweds of Falls Church, Virginia. K4LMB is her call; W3CN is his. YLRLers will recognize the former Ethel Smith as the founder of the YLRL in 1939. Tex may be recalled as the brave man who chairmanned the YL and XYL program for the Tenth ARRL National Convention in 1958, with Ethel's help, of course.

Pat Radcliff, KØSQK, of Pueblo, Colorado, (at right), recently received the first trophy awarded in the U. S. by the Cleveland Area Council of Amateur Radio Clubs. (The first trophy was issued to a KP4 OM in 1950.) The XYL of KØSPQ and the mother of four small harmonics, Pat has had her ticket just a year. She's on 10 meters mainly, with occasional jaunts to 15 and 40 c.w.



Members of the new UPYL net, left, organized in June, met in person for the first time at the Upper Peninsula of Michigan hamfest in August. The net meets Monday at 0800 EST on 3920 kc. W8HAV is co-ordinator. Members shown are front row: K8DWA, K8KIT, K8TGX, K8SUP, W8HAV, K8ILN. Standing: W8MMB, K8OMH, K8SRO, K8DTD, W8JXJ, K8PNA.

QST for



"Old San Antonio" will be the site of the 6th annual Birthday Party of the Texas YL Round-Up Net on Nov. 5. The Alamo YLs, hostess club, extend an invitation to all YLs to attend the festivities. (See Coming Events) Alamo YLs in the photo are L. to r. K5YCE, W5TSE, W5WXT, K5OPV, W5KQG, K5OPS, and K5OPT. (Photo by K5OZO)

G. L. Dosland, WØTSN, President of the ARRL, and his wife Mary, KØWKS, (ex-W5DEW) were honored guests, right, at both the YL breakfast and luncheon at the West Gulf Division Convention in June at Dallas. Some 95 YLs and YLs enjoyed the YL program arranged by the Women Ham Operators of Texas under the direction of K5GMI, Ruth, and her OM W5QEO. Shown at the head table are Mrs. and Mr. Dosland and K5GRF and W5JCY. (Photo by W5OWP)

North, South, East and West

At the start of the air race in Torrance, Calif. (see page 66) Marian Fraink, K6CPX, Chairman (left) was assisted by Bernie Hunt, XYL of K6KNP, in 40 meter operations throughout the five day race period. W6PMO, club call of the Associated Radio Amateurs of Long Beach, was used. OMs W6PGM, K6KNP, and W6GKM assisted the headquarters station in operations on 15 and 2 meters.

(Photo by W6GAU)



Feminine fortitude to the fore! Four members of the Pincurl Net, below, set out the last week end in July on a radio safari to prove to their husbands that they could handle communications in the field without male assistance. Successful they were, contacting 150 stations in 11 states in 24 hours on 50.2 and 50.4 mc. Equipment for the trip to Charles Mound, Illinois, highest point in the state, included a gasoline generator, radio gear, camping supplies, two tents, and a forty-foot antenna, all toted and set up by the girls themselves. Considerable newspaper and TV publicity resulted, tying in nicely with our push for more YL publicity for ham radio. Posing at their "summit camp" are operators Eleanor Plumlay, K9IEF, Beverly Sipple, K9RRT, Micki Rosenbohm, KØGRQ, and Betty Moore, KØRTL.





report, ARRL section, U. S. Possession, VE district or country. Entries in your log should also state the band you were working at time of contacts, power, time, and date.

SCORING: (a) C.w. and phone sections will be scored as separate contests. (b) Multiply number of contacts by the total number of ARRL sections, U. S. possessions, VE districts, and countries worked. (c) Contestants running 150 watts input or less at all times may multiply the results of (b) by 1.25 (low power multiplier).

AWARDS: Highest c.w. score — gold cup. Highest phone score — gold cup. The top three scores in each contest will receive certificates. Highest c.w. and phone score in each ARRL section, U. S. possession, VE district, and country will receive a certificate. Highest combined c.w. and phone score, YLRL member, will receive the Corcoran Award.

LOGS: Copies of all logs must show claimed score and be postmarked not later than Nov. 19, 1960, and received by the Vice President of the YLRL, not later than November 30, 1960, or they will be disqualified. Send copies of logs to: Lillian Beebe, W5EGD/3, 923 Kent Avenue, Baltimore 28, Maryland. Include zone number in address. No logs will be returned.

COMING EVENTS

Texas YL Round-Up Net — 6th annual Birthday Party, Nov. 5. Alamo YLs of San Antonio, Texas hostess club. Bevelere Motor Hotel of San Antonio will be headquarters. Registration of \$2.25 for the luncheon should be sent by Oct. 25 to Ethel Chastain, K5OPR, 4338 Seabrook, San Antonio. (See photo on page 65).

Florida YL Week — Jan. 8-15, 1961 has been designated as Florida YL Week by the Florida YLs. Details later on this new club event.

1960 AWTAR

The fourteenth annual All Woman Transcontinental Air Race covered a distance of 2509 statute miles, from Torrance, Calif. to Wilmington, Delaware. Starting at the Municipal Airport at Torrance on July 9 at 9:00 a.m. PDT, close to 160 Powder Puff Derby contestants had until noon on July 13 to cross the finish line at New Castle County Airport at Wilmington.

As said here before, the full story of the race would take pages to relate. Accounts of the famed air derby may be found in various flying publications, and anyone interested in women in aviation should find such accounts highly interesting.

For the ninth consecutive year amateurs throughout the country aided in the relay of information pertaining to the race and its contestants. Serving her third year as chairman of the radio net was Carolyn Currens, W3GTC, of Norristown, Pennsylvania.

Mrs. Betty Gillies, of San Diego served as chairman of AWTAR for the eighth time! An amateur herself (W6QPI), Betty supplied the following comments concerning this year's derby:

"The race was again a tremendous success. There were 85 entries of which six withdrew before the start, leaving a field of 79. Weather was typical — we had the good and the bad. The bad was mainly in the East, on the route between

Chattanooga and Roanoke through the mountains. Nevertheless, 77 of the 79 got to Wilmington, although one was late (the pilot had to leave the ship at Chattanooga to meet her husband in New York for a trip to Europe and the co-pilot brought the ship in). The two which didn't finish at all were held up by mechanical difficulties, one at Roanoke and one at Johnson City. Winners of the race, a handicapped, were Mrs. Aileen Saunders of El Cajon, Calif., pilot, and Miss June Douglas of Fall River, Mass., co-pilot, who flew in a Cessna 172. The final results were computed for us by Remington Rand Univac on one of those fabulous mechanical brains (Univac Solid-State 90).

As always, the ham net was a tremendous help, and I don't know how we could have managed without it. W3GTC will have to fill you in on the details because I actually never was able to get into a "shack" and listen in to what was going on. All I know is that the results were great. Whenever I asked Carolyn where such and such airplane was, she always had the answer!"

From radio net chairman W3GTC comes the following summary of amateur communications set up for the race:

"First, the net operated very well, mostly on single sideband. I think there were three a.m. stations out of thirteen. Each year since 1958 I have tried to get all operations on s.s.b., but it is still not possible. Here is the list of as many operators and chairmen as I can give you: Torrance, Calif. — Associated Radio Amateurs of Long Beach; K6CPX,* chairman; W6PGM, K6KNP, and W6GKM. Needles, Calif. — K6JZD, chairman, Prescott, Ariz. — W7BSO, chairman, Winslow, Ariz. — W7REO. Albuquerque, N. M. — Mars Station, Kirtland AFB, K5LBM, chairman. Amarillo, Texas — Panhandle ARC, K5LIN, chairman. Oklahoma City, Okla. — Aeronautical Center ARC, Walter M. Hill, chairman. Fort Smith, Ark. — W5QHY and W5ANR. Memphis, Tenn. — ARC of Memphis, W4WTJ*, chairman. Chattanooga, Tenn. — Chattanooga Frye ARC, W4JVM, chairman, with W4QT and W4BEV. Johnson City, Tenn. — Tri State ARC, W4WRH, chairman, W4GBT*. Roanoke, Va. — ARC of Roanoke, W4JQO, chairman. Wilmington, Del. — two radio clubs of Wilmington, K3HOC*, chairman, K3MAW. W3CUL* also assisted. (Asterisks denote a YL).

There were many others helping out — especially K3EMT, who spent many hours during the week on 20 meters for schedules to Torrance from Wilmington. Each year it seems to be a little easier and things go more smoothly. Next year the race starts in San Diego again." **QST**

Strays

The RTTY Society of Southern California announces another RTTY Sweepstakes from 1500 EST Friday November 4 to 2400 EST Saturday November 5, thus giving thirty-three hours of operating time. Stations will exchange messages consisting of message number, origination station's call, check or RST report of two or three numbers, ARRL section of originator, local time (0000-2400 preferred), date, and band used. Score one point for a message received and acknowledged by RTTY. For score, multiply total message points by the number of different ARRL sections (see p. 6) worked. Two stations may exchange messages again on a different band for added points, but the section multiplier does not increase when the same section is worked on another band. Each foreign country counted by ARRL for DXCC credit is treated as a new section for RTTY multiplier credit. Suggested congregating frequencies include 3620, 7140, 14,090, 21,090 kc. Logs should be mailed to Merrill L. Swan, W6AEE, 372 West Warren Way, Arcadia.



How's DX?



CONDUCTED BY ROD NEWKIRK,* W9BRD

Whereas:

The Map Scrutinizers of America, a spontaneous and diffuse DX group now numbering in the thousands, will be interested in another Pacific item uncovered by MSA charter member W9ZYD. It's an uninhabited 1.6-mile-long island about 22°S and 174°E called Conway Reef, a spot apparently isolated from adjacent blanket territorial jurisdictions. No ordinary old atoll, Conway featured a bush-sheltered cave of useful dimensions when last inspected in 1904. Need a country with a cozy built-in hamshack, OM? You'll have to jump W9ZYD's proxy claim.

Dr. T. R. van Dellen, in his "How to Keep Well" column syndicated by the Chicago Tribune, recently discussed results of an extensive British survey on the incidence of coronary heart disease, statistics compiled by Dr. J. N. Morris of London. Italics in the following excerpt are ours:

British death certificates showed . . . that coronary heart disease was commonest in light workers. . . the majority [having] light jobs in which stress was marked. *Radio and telegraph operators were highest on the list*, followed by priests and monks, dock and harbor officials, chemists, physicians, commercial brokers, Anglican clergymen and musicians. Occupations comparable to executives here were low on the list. Bureaucrats were far below the average for all men.

There are few sources more conservative and unimpeachable than a batch of British death certificates, so these facts seem irrefutable. Dr. Morris researched in vocational terms, to be sure, and amateur radio, like any other hobby, is supposed to be releasing. But those mad DX pile-ups! Easy—easy does it, fellows.

DL1QT becomes the first to claim possession of valid QSLs for QSOs with ARRL DX Century Club members in all United States (see p. 83, March 1960 QST). Helmut writes from assignment in Turkey where, since he cannot be active on the air, he finds solace in poring over his logs and records. The appearance of W0VKB in a recent new-members DXCC Honor Roll listing gave DL1QT North Dakota for his "WAS-DXCC" clincher. It's not "official", however, till he ships us a photo of all fifty QSLs, so someone else still has the chance to edge him out for "WAS-DXCC" No. 1.

What:

This month's correspondence critique praises 20 meters as usual, reflects widespread anticipation of another profitable 28- and 21-Mc. season, and discloses burning 40-, 80- and 160-meter DX ambitions among Jeevesie's pen pals. As for late-summer action, K6CJF aptly likens our bands to Longfellow's famous little girl who had the little curl

right in the middle of her forehead. (When she was good, she was very, very good, but when she was bad, she was horrid.)

10 phone is interesting to watch for comparison with last fall. So far, so good, according to K1s AOR EDV MEM, K2YFE, K4OSR, K6OZL, K9SPO, EL4A, ISWL, E. Edger and A. Hovey who report CRs 4AD 4AX 6AT 7AU 7FG, CT2AH, DL3RO/EP, EA8s CK DJ, EL4A, F08AF, HC1AM, HKs 3LX 6AL HP1SB, JA's 2VF 3EK 9CQ, KA2GI, KC6PE, KR6CE, KV4CG, KZ5s AT MIS UR, OD5CN, PJ's 2AZ 3AD 3AI, PZ1BF, RA9s CAB CGB FH HAA KDK KHA SA WAA, RA0WAA, RB5KIA, RH8s ABN ALD, RJ8AAB, VP's 2GAQ 4RL 6EB 6JC 6TR, VO's 2IS 2SB 3PBD 4ASC 5GS 8AV, VS9AE, XEs 1CD 1JP 2R, YA1BW, YN's 1AW ANK, YV3DQ, ZD2s AMS ATU JKO, ZETJV, ZP9AY, ZS3s RO Z, 5ACV, 9M2GA, 9Q3s AU IG and 9USJH. . . . Ten c.w. will go down fighting, if K2UYG, K4TEA, W8NOH and K8VMZ have anything to say about it: CN8DJ, CX2BT, KB6AZ (41) 18, LU1NE, 9Q5FV (113) 13-14, VP8EX (8) 13, YV4s AT BE, ZDZJKO (60) 12 and ZE5JU (75) 13 help them keep the ball rolling. Those numbers in parentheses represent kc, above the lower band limit; figures outside parentheses indicate approximate time in GMT whole hours.

15 c.w. finished summer coming on strong. W1s BDI 0PB, K1s AOR JFF MEM, W2JDK, WA2KMY, K2s KYH UPD, K3s CUI GCS, K4s HEX MPE (68/45 countries worked on 10), TEA TKM, WA6FCX (71/32), K6s CJF OZL ROU, W7s POU YAO, W8s KX NOH, K8s JCB NHC QEX, K9s PYB SPO UKM, K0s VMZ WQI, EL4A, IIER, VE2AOQ, ZS2U, A. Hovey and A. Rugg specify CE's 1BD 14, 2AT 4EC 23, CN8AC, CRs 5AR (50) 22, 6CW, CX1AA, DMs 2ARL 23, 3DA/ZN 3ZML (60) 23, EA's 6AM (45) 19, 9AP (60) 15, FA's 2VF 3CT (60) 16, 8TT, FG7XC, F08s AF HE (46) 16, GD3JZK, HA5TA (16) 23, HC1JU, HH2s JV (61) 1, NV, HKs 3TH 6AL, HP1SB, JA1CPY/mm, KG6AJT, KV4AA, KX6CA, LU5ZY (40) 18, LZ1s KNB WD, MP4BDB (66) 18, OA's 3D 4H 4JR, OE's 1UA 3TL 3VP, PJ's 2CJ (60) 22, 2ME 16, 3AI, Fernando de Noronha's PY7LJ (75) 20, PZ1AU, ST2AR (61) 23, SV8s WI (29) 16, WQ WZ (33) 21 of Crete, TF3MB (20) 16, T12s LA WA (135) 9, UA0s KID (60) 23, KZA, UB5s KED UG WE WF, UG6AW, UO5AA (60) 20, VP's 1JH 2ML 2VA 3VN 6AF 9EH 9C/p (35) 16, VO's 2MS 3HZ (55) 18-19, VS9MB (78) 20, WH6DJV, WP4s ATY ATY, XEs 1PJ (69) 16, 2OK, YO5LF, YV's 3CD 5 ANK (85) 23, ZB's 1FA 1HC 2AD (29) 16, ZD2s ATU DCP (81) 16-17, IHP (38) 13, JKO (15) 22, ZP's 5LB 6AY (80) 1, 9AY, ZS3D 18, 4X4FU (26) 19, 5As 2TZ 0,



* 7862-B West Lawrence Ave., Chicago 31, Ill.



Z52U has captured 165 countries and a flock of W/K/VEs with his neat Port Elizabeth layout, mostly on c.w. AI, a homebrew-forever type, uses an EF42 v.f.o., 6AQ5-6AQ5-807s rig at 60 watts; his receiver is a 6AB7-6SA7/6CS-6SK7-6SK7-6SQ7/6CS-6K6 2-Mc. tuner which backs up a set of crystal front ends on 7, 14 and 21 Mc. Infrequent Z52U phone work presses the 6AQ5 driver into service as a 12-watt final. . . . Z57P (right) is rare enough to tweak the ears of any DX bound. Peter regularly issues Swaziland sideband QSOs to North Americans at 1000-1100 GMT on 14,260 or 14,345 kc. with a G5B-100 and NC-300. A new rotary beam is in the works.

5TA (10, 70) 20-22 7G1A (49) 18, 9K2s AD (66) 18-22, AM, 9Q0s IG 15 and RV.

15 Novice notes dwindle down to dispatches supplied by KNs 3LJZ 3KHK and 5VON concerning good luck with CT1DJ, GC3MBM, HH2WB, HP1BS, KL7s CDF USA, KP4AO, KZ5CT, OD5CT, OK1ZW, ON4s JS PX, T12LA, XE3CY, YV3AS, ZB1HC, plus DX-stale Novices. While DKU DMU and WPA4UL. There are plenty of Gs and DJ/DLs, too.

15 phone still outdraws 20 when the skip is right. W1BDI, K1s AOR JFF MEM, W2JDK, K2s KYH TDI* UPD, W4s AXE* UWC*, K4s DFT IEX MPE TEA, W6DNNM, K6ROU, W7YAO, K8s JCB QEX, K9SPO, EL4A, GC2RS, D. Edger, A. Hovey, A. Rugg and VERNON fans got together with CE3s AGI, DY, TN WU, CN8CS, COs SCN 7FH 7RO, CP5EC, CR4AS 21, CX 4AW (270) 23, 9BA*, ELA 1D 4L* 6D, FA2TW (256) 21, FFs 4AB 4AC 7AB, GD3s ENK UV, HCs 4IE 7RP 8GL, HHs 2MC 4VB, HI8s DGC DGH GA J8M TBW, HKs IOI 3LX 3QA 3VV 6AC (249) 3, 6SE, HPs 1HC/1 3RL, HRs 1HP* 2HA 3MB, HZ1AB*, KGs 1AA 1FR* 4AD 4AO, KJ6BV*, KV4BM, KW6CS, MP4s BCY BD4*, OAAs 1D 4H, OE5OW OD5*, CLCT*, PJAs 2AE 2MC* 3AL, PZ1s AR AW (315) 0, BK BP, SP0RF, SV8WK (425) 20, TG9s CD (173), TI, T1s 2LA 2RKL 5AX*, UAAs 1KBB 3DA 3QC 9KOG, UO2AN, UR2BU (260) 22, VPAs 2AR 2GAQ 2LS 2SI* 3HAG 5BL 9BO, VOs 2AB* (428) 22, 4RP* (428) 22, 5AU (245) 20, VS5GS, W7AHW/KG6*, XE8NHD*, YV5s AGA ANG APX, ZB1WW, ZC4AS, ZPs 500 6BB*, 5A2T2*, 5O1TF 7G1A* 20, 9G1BA, 9M2GT, 9Q0s FV 15, FW KU and 9U5H 21. The asterisks (*) stand for single-sideband users.

20 phone favors K2s TDI* (100*), UPD* YFE, W4E2FN, K3GCS, listening KN3LJZ, K4s DAD IEX KYB, W6AKF, W8KYD, K8s JCB QEX, K9SRR, K9s QHF (operating K9WBD), VMZ WQI*, EL4A, Messrs. Edger and Hovey with the radiations of AP2Q (152), BV1s US USB USE, CE2CO, CN2AQ, COs 2JL 8JR 8OK, CR6CA* (348) 22, CTs 2AH 3AV*, CX4AW, EAAs BC (200) 2, CP, FAs 8TT 9QW, FG7XH, FOSAU, FP8BH*, HH5MU, HH8DGH, HKs 3TH 4JC, HP1s KA ME SB, HR2s DK (173) 2, FG HA, HZ1AB* (315) 23, K4ZHM*, KC4USN* (315) 3, KGs ICQ* IFR* 4AAI 4AD 4AE* (325) 2, 4AO 6AJT 6FAE*, KJ6BV* 11, KM6s BI BT, KR6s CS IN IW KA* 11, SA*, SW6s CL* (325), CVs (270) 4, KX6BT (270) 14, OAID, OE1RZ, OK1JH, (260) 23, PJ3AD, PZ1BJ, TF2WEM, TG9s MT TI, T12s AS EH VMB, UAAs 1VB 1KAE of Antarctica, 3RG, UB5F*, UP2KCK, VKs 9RO 8PM, VPAs 1AB (230) 3, 1JH IRT 2AB 2DA 2DU 5VL 7NE 9BN 9DC* (320) 0, 9Q0, VKs 1F 3D (185) 3, 4CW, 94JF, VU2s NR* 2J, Ws 2AYN/EP 3ZA/EP*, XE3BL, YN1s FF WW, YVs 3RI 7CC, YS1s IN MS* (300) 15, YV5s AKE HU* (310) 23, 9G1s BQ* (340) 0, CW, 9N1s CJ* GW*, 9Q0s GA* RU and US*.

20 c.w., International Route 1 for all hamdom, finds W1s BDI OPB TS, K1s AOR JFF (80/61 worked/-confirmed), MEM, W2s GVZ (261/258), JBL, K2s QXG UPD UYG, W2s EFN (72), KMY (95/56), W3LOS (111/98), K3s CUI GCS, code-practicing KN3LJZ, W4PLL (251/242), K4s DAD (66), DFT IEX KYB LRO TEA (147/122), TKM, KLLJ (45/31), W6s JQB RCV, K6s CJF (107/91), OZL (70/41), ROU 8TZ, W8s AKF DNM (30/22), FCX (71/31), W7s DJU POU (65/44), YAQ, W8s KX (190/180), NOH, K8s HPK JCB (134/114), NHC (67), QEX, W9JN, K9s PYB (59/31), SPO SRR, K9s VMZ (85/42), WQI, EL4A, 11ER, Z82U and A. Rugg

quite busy with the likes of one AC3AZ, AP5B (50) 22, BV3HPT 8, CEAs 1AD 1DD 1DN 4FX 5, 6AD, CMs 2QN (50) 4, 7JK, CNs 2AQ 2BK 2BD 6MB, CO2s BM EU WU, CPs 1BE 3CD 3CN (70), CR5AR, CTs 2BO (10), 3AV (42) 22, CXs 1 BO 2BT 2FD, DMs 2AFC 2AQB (57) 23, 38MD 3YDA 3YVL 3ZBM 7EAM, DUAs 1OR 7SV (35), EAAs 8BW (70) 1, 8CP (49) 22, 9AQ, EL2U, ETJUS (345) 9, FAs 2VF (80), 3CT SRJ (85) 3, 8TT, FB8s CJ XX YY, FG7s XE (40) 23, XF, FOSAU (35), FM7WK (35) 4-5, FK8AH 11, FQ8s AJ (15), HV, FRZD, FY7s YF (50), YI11, GBLJY (26), HAAs 5B15DU 5FX 8CT 8CT, HCAs 1JH (27), 2CS (80), 4IE 5CN 5IS, HE2BAS, HH2s JV OT (20) 4-5, RD, HKs 3TH (20) 20, 4JC 6AI, HP1SB 3, HZ1HZ, IS1s DKL ZUI (5), IT1s AGA (40), ZND (1), JAAs 6AWD 6ZD 7LA (82), 9FV 8MK, JT1AA, KAs ORQ/EP (15) 2, 6LJR/KG6 7, KAs 2FF 2JF 2JL 2JS 2LR 2RT 8PB, KC6TB, KGs 1BB (40) 1CW, 4AA 4AD (93), 2AN 6AIG 6AJT 6CY KM6s BI BT KT KR6s CCA 1W 1JL (25), KV4s AA CI/mf, LAsYB/p of Jan Mayen, LKs 1AC 3HD, LZs 1AF 1KNB 1KPC (23), 2KSK, OEs 1UA 4KB (62) 0, 5AW 7FW, OA4FN (8) 4, ODSAR 23, OX3s JI MT UD, OY7ML (22), PIJZW of Holland, PJAs 2AE (23), 2CQ 3AD, PZ1BP, RAEM of Moscow, SM1BVQ (50) 23, SP1LH/mm near ZDI, SL5AB of Sweden, ST2AR (50) 23, SU1AL 23, SV8WZ of Crete, TFs 2WFF 3AB, T12s CMF DL DN PZ, UA1KAs of Antarctica, UA9s DB 2, DM (38) KCA KCT KYB OV, UA9s BN BZ CE EC FE FG FR JU KFM KID KZA (11), LN, UB5s CT IJ KEF KKE (85), MZ WI ZV, UC2s AR (5) 3-4, BL LE WP, UD6s AM (20) 23, BB KAs, UF6B (1) 1, UG6AW (20) 23, UH8KBA, UH8AK (72) 12, UL7s IB KAA KBH, UM8s KAA (20) 23, KAs UN1s AB AB, UO5PK, UP0L-5 of the polar north, UP2s AC AT KCB KNP, UO2s DO 1-5, KAY, UR2s AO BA FG, UT5BK, VE4CA/SU (60) 23, VE8s AP AV MC TU, VKs 1JE (15), 8TF 9GK 9KK (70) 11, 9NT 9RO 9VM (20) 11-12, 9XK 9WH, VPAs 1JH 2VA 3YG (15), 6AF 6AP 6GV 6LN (30), 6FR 7BK 9BN 9DL 9EX 9KK 9Q0, VOs 2EW 22, 3HZ 4HT (65) 21, VOs 1B (60-90), 10, 2DK 2DX 3KD 4CW (18) 11, VSs 1ED 1JY 4BA 6EN, VU2NR (65) 1, Ws 2AYN/EP (2) 1, 8UTQ/3V8 (8) 23, XE3BL, XZ2s BB 11, TH, YNAs 1OC (9), 4AB SAN, YOAs 2BU 3FH (70), 3IA (55), 3IF (35), 3RI (5), 3WL 6XI 9IF, YVAs 4AU 4BT 5APR (55) 23, 5AKU 5ANE 5ANI 5EZ (28) 22, ZBs 1ET 1HC 2AD 2, 2I (82), ZCs 4AK (60) 23-0, 4BC 4CP (25) 0, 4SS (25) 0, 5AE (29) 9, ZDs 2DCP (81) 16, 2GUP (80) 22, 2JKO 2JM 6NJ (85) 5, ZK1AK, ZLs 3VB of the Chathams, 4JF 4 of the Campbells, ZP5AY, ZS7s M R, 487EC 12, 4X4s JU KP 6O2s AB (35) 20, GM, 9Q0s LL (15) 23 and PS.

40 c.w. can't match dazzling 20 but KN3KHK, K4LRO, W6RCV, K6s CJF EAY, W6DNNM, W7s DJU YAQ, K8s CJB NHC QEX, W9JN, K9RHN, K9VBU, EL4A, Z82U, ISWL and s.w.l. Rugg have a gala time with CE1DN, CN8BP, COTAA, DFTSY 11, EATJZ (14) 5-6, FF8BF (22), 22, HCAs 1LE 4IE, HKs 5CE 7MM, HP1SB (1) 7, ITIAGA, JAAs 1BOK 1BTH 1DIC 1DNI 1DUH 1EUR 1YL 2AEY 2AJI 2AJJ 2AW 2XW 2XF 8QO 8MV all around sun-up, 8CKCT/KH6, KG4AD, KV4CI (5), LZ1KGZ, OR4TX of Belgian antarctica, PYs ignore, UAs 3GM 9XP 9KKS, UJ8GC, UL7FA, UH8KBA, UP2KCK, VU2K 3, VR2DK 10, 2, VS8PM, VU2CQ (46) 14, YUs en mass, YVs 4CI 5AL and a hatful of VK/ZL colleagues.

40 phone is holding its own with W3CYZ, K4DAD, K5VRX, E. Edger, EL4A and ISWL capturing CE2MH, EL1H, FF4AB, Gs and DLs, HH6s, IT1SMO, KH6s ATT DHI WAG, KZ5BK, LU8ZA, LZ1UF, PYs

1YV 2CEI 2QT 4CP 5LP, TF57P, TG5HC, UB5LV, UP2KNP, YV5s ABH 5A, XE5a 1PLR 2SG, ZDIAW, 4X4FA, 9G1s CC CW and DM.

80 c.w., still a traffic man's stronghold, features CO2QR, DJ5 1VC 5FS, DL7BQ, EA4BS, EL4A, HP1AP, OKs 1AAE 1KAY 1KCR 1KEI 1KNG 2QR 2VET, UA3BS, UN1A, ZB1FA and ZP9AY on its low edge. October often is a lively 3.5-Mc. month because noise levels are favorably low in both northern and southern hemispheres. Preceding 80-meter items come courtesy A. Rugg and ISWL of London.

160 c.w.'s hard core of persistent personnel were interested to hear W1BB's report that W2TR was logged in Europe in midsummer. ISWL's 1.8-Mc. communique says DL2AH, GD3s FBS UB, G6TK, GM3s FSV KBZ/p, GWs 3ALE 8KFA 8PG and OK1KFG have keys plugged in and final amplifiers loaded for the anything-can-happen 160-meter season now getting under way.

Where:

Asia — Malaysian Amateur Radio Transmitters Society secretary 9M2DB advises QSLs for VS-VSces for 1978, and ZC5 stations can go via MARTS, Box 777, Singapore, and those for 9M2s to MARTS, Box 777, Kuala Lumpur, Federation of Malaya. K4ZKI says VS1F handles that Singapore bureau. Operator Bob of VS9MB writes W1TS respectively: "Although, of course, QSL cards are nice to receive, the most important aspect is the QSO."

Are W/K/VEs too inclined to "tail" the dog? Ws 1UEI and 2GVZ chorus QSL information for K1QRQ/EP. W/Ks can send cards to Hal at MAAG-RSG, APO 205, New York, N. Y.; all others should mail theirs to Amateur Radio Club of Iran, P. O. Box 951, Tehran, Iran. K1QRQ also assists in distributing cards incoming to ARCI for other EP stations. W4OSG writes from Formosa that "The correct mailing address for BV1US is USFDC-MAAG, APO 63, San Francisco, Calif., and self-addressed stamped envelopes are appreciated. U. S. postage is just fine, too. GMT, please, to facilitate log checking." Grant adds that QSLs for BV1s USC and USE can go via BV1US. From HL9KT (W9QPI): "I am answering cards as fast as possible but we are still snowed under with paperwork. Really appreciate the IRCs and self-addressed stamped envelopes; these merit answers first, and our policy is to answer cards as received. Wish everyone would use GMT!"

West Gulf DX Bulletin "Where" comments: VS9AZA is declared ungood. W3A (OD5CT-W3ZA/EP) holds the calls MP4s BDD MAG TAI and QAQ for various GUL stops. VS9ARF (G6JMI) inherits Aden VS9 bureau duties from departing VS9AHM. W1WDD is another who seeks a TABUS QSL after years of fruitless effort. Peter, with 240 confirmed, has a pleasant surprise in store for the lucky DX operator who happens to become his DXCC-250 clincher. "Sent out about 2000 QSLs from Japan," testifies KA2CB, returning to New England and K1GAA. "If anyone still needs a deserved card, my Vermont address will be okay."

Africa — ZD1CM's QSL chores are handled by W5KYQ. Ed labors similarly for CT3AV, VP2AR, VU2RM, ZDIAW and 487WP — s.a.s.e., by all means. ZD2JM notifies K9EAB he has signed on for a three-year Lagos hitch. Cliff will continue to serve as John's Stateside QSL agent, s.a.s.e. required. ZD2JM's direct address: c/o Assistant in Chief (Radio), P&T HQ, Lagos, Nigeria. VERON's D Xpress confirms that 601s are ex-1Bs as in the case of 601TUF (ex-1STUF); 602s are ex-VQs. In most cases the suffixes remain the same. WGDXC understands that W8UTQ/3V8 retains XW8AH logs and will entertain QSL inquiries concerning his Laos tenure c/o U. S. Embassy, Tunis, Tunisia. "An incoming mailbag was lost last week," laments EL4A. "About a hundred hams will have to reapply for Liberia confirmations. Say, the omission of Greenwich Mean Time on QSLs can drive one nuts. Ridiculously ill-chosen phonetic-alphabet indicators also are exasperating on phone." Q as in cucumber?

Oceania — "Please be advised that I'm no longer in the employ of Matson Navigation Co. aboard SS Monterey," communicates WA6DFH. "I may not return to Tahiti to use my FO8AX call but I've enjoyed sending out more than a thousand QSLs over the past two years." G6RZ welcomes QSL inquiries at his WA6DFH address with full data (GMT) and s.a.s.e. K4TKM needs tracers on K6GNL/KW6, worked four years ago, and ex-ZL1FG. W4GSJ seeks the current whereabouts of the KM6AX he worked on phone around that same time.

Europe — Arctic OR4TX, according to informant W6RCV, can be reached via UBA (Belgium), Box 634, Brussels, or through Yvonne Pearson, 83 rue Tilmont, Brus-

sels, both Belgium. G3LB recommends a photograph-personalized QSL for maximum returns. "The cost is but a fraction of the amount an amateur usually invests in his equipment, and the results justify it." W7DJU echoes Arthur's sentiments: "Since I stopped sending out cards with pictures, letters, etc., my incoming mail from DX has stopped in its tracks. Proves to me if you don't do something a little special, your returns may suffer."

TF2WEN (W4WTK) was up to his ears in unclaimed QSLs destined for TFs 2BJ 2BWT 2CWO 2DDA 2KA 2VCC 2WB 2WC 2WD 2WZ 1Z 3AP 3PI 3WDY 4BDH 4WDH 4WN 5TP 5WAK 5WDD 5WDK 5WDW 6GI 6WEI; also TF2Bs BC BD BG BH BS BY BZ CC CD CF CJ CK CN CO CP CQ CR CS CT CW CY DA DC DE DF DG DI DJ DK DN DO DP DR DV DW DX DY EA EC ED EG EK FE UE and VB. Parties concerned please claim same with stamped self-addressed envelopes to ARRL, attention K1LVW. "I am now QSL manager for IIER," states K4KYB. "The usual self-addressed stamped envelopes are requested for prompt returns."

Think you've got QSLs? SM5WI asked K2QXG if anyone issues certifications for collections of W/K cards in 3-, 4- and 5-ft. stacks.

South America — K4HPR advises, "Ex-CE2CZ, CE3GI, now attends medical school in Birmingham and says he will be very pleased to send CE2CZ QSLs to those whose contacts are still unconfirmed." Cesar's Alabama address follows. Ex-VP4WD (G3TA) tells K3CEK, "Any stations who need my cards for QSOs from Tobago will receive them after receipt of their QSLs." Jack is available through his Call Book QTH or via RSGIB. Notes from W8NAN and others indicate that it's time to mention the QTH pattern for far-south LU-Z-stations. That "Z" stands for Argentine antarctic locations and offshore points near by. The last letter of the call is the key to various bases in the area. Representative LU-Z-Call Book listings will give you the idea.

Hereabouts — FP8BM QSL manager K2VZJ protests to W1TS the heavy income of QSL requests sans s.a.s.e. Transportation must be provided if you want that St. Pierre pasteboard. Listener Andy Rugg is one of the many who commend QSL results accruing from W2SAW's foreign-mint postage approach. Check with the latter for details.

K1MEM, W2JDR and K6PL volunteer clerical services for deserving rare DX stations in QSL distress. W1QLT of XE0QLT/XE5 writes that special cards for his Alacran reefs QSOs began disseminating last month. John, W1GPX and party, studying reef formation and growth, hope to have more power and DX time available when they return to the breakers next summer. Diligent and generous reportorial effort by W1s BDI OPB TS UED GWC, K1s AOR LVW MEM, W2s GVZ JBL JDK, WA2KMY, K2s QXG TDI UFD UYG, W3LOS, K3CUI, KN3LJZ, K4s GMR HPR IEX TEA ZKI, W6RCV, WA6FCX, K6s OZL ROU STZ, W7CWE, W8s KX NOH, K8s NHC QEX, W9JJN, K9RHN, K9WQI, KH0BXU, Z87P, KL7AZZ, A. Rugg, Hamfester Radio Club, International Short Wave League, Japan DX Radio Club, Kanawha (W. Va.) Radio Club, Newark News Radio Club, Northern California DX Club, Ohio Valley Amateur Radio Association, Polar Bears Radio Club of Sweden, VERON of Holland and West Gulf DX Club produced the following individual specifications:

ex-CE3GI-CE0ZC, C. Guzman, 348 22nd Ave. S., Birmingham 5, Alabama
CE4EC, M. Espinoza E., Box 20, Rancagua, Chile
CE6EJ, E. Huckle, P.O. Box 416, Temuco, Chile
CO2DD, J. Calvo de Dios, Box 6996, Havana, Cuba
CP6FJ, C. Tamplin, P.O. Box 55, Santa Cruz, Bolivia
CX8AN, O. Spera, Box 777, Montevideo, Uruguay
EL2U, c/o Liberia Air Taxi, P.O. Box 183, Monrovia, Liberia
ET2KY, R. Kelly, ASEA Det., APO 843, New York, N. Y.
F82CP, P.O. Box 152, Diego Suarez, Madagascar
FG7XH, Box 335, Point-a-Pitre, Guadeloupe
FM7WK (via W4ZKE)
FO8AX (see preceding text)
FP8BM (via K2VZJ)
HA1KZA, Kossuth u. 48, Zalasszentgrot, Hungary

KA7AX cruises 20, 15, 10 and 6 meters in this cozy Kyushu cockpit when off duty as Far East Network radio engineer. Bob is W6UUX on our side, also ex-JA2AX-JA7AX-KA9AR.

October 1960



HCIAM, Box 2977, Quila, Argentina
 HCIARE/HK8, Box 239, Rio de Janeiro, Brazil
 HIBDGC, Avenida General Galarza, 1110 No. 1, San Cristobal, D. R.
 HK3JK (via LCRA)
 HK3UA, Box 13233, Bogota, Colombia
 HK6AC, Box 524, Armenia, Colombia
 HIER (via K4KYB)
 IIRIF (via IIRIF)
 JAIGRT S. Kusama, 127 Eifuku-cho, Suginami-ku, Tokyo, Japan
 K1CRB/XV5 R. Wallace, Box 28, APO 143, San Francisco, Calif.
 K3CKT/KH6 Box 458, Kekaha, Kauai, Hawaii
 K3IZT/KG6 (via W3KT)
 K4ORO/EP (see preceding text)
 K7GMZ/EP (see preceding text reference K4ORQ/EP)
 K6GAJT P.O. Box 145, Agaña, Guam
 KX6BT APO 435, San Francisco, Calif.
 KZ5GM Box 185, Margarita, Canal Zone
 OR4TX (see preceding text)
 PJ2CQ J. Schrier, c/o Naval Base Parera, Willemstad, Curacao, N. A.
 PZ1AW, W. Hekkenberg, c/o Surinam Aluminum Co., Moengo, Surinam
 PZ1BJ, P.O. Box 32, Paramaribo, Surinam
 TF2WFF, 667th AC&W Sqdn., Box 174, APO 81, New York, N. Y. (or to K4APM)
 TG9CP, Box 115, Guatemala City, Guatemala
 TILZT, P.O. Box 26, San Jose, C. R.
 UA2KAA, Pioneer's House, Kaliningrad, U.S.S.R.
 UB5AQ, V. Shipilev, Radio Club, Dnepropetrovsk, Ukrainian S. S. R.
 VE8AP, Naval Radio Stn., Aklavik, N.W.T., Canada
 VK8NT, Box 40, Darwin, N.T., Australia
 VK6JM (to VK2AZM)
 VP2DU (to VP2DA)
 VP2VA (to W6NW)
 VPSVL, Box 215, Kingston 10, Jamaica
 VP8EM, J. King, Box 107, Port Stanley, Falkland Islands
 VP8EX (via RSGB)
 VQ2MS, M. Serrao, Box 435, Luanshya, No. Rhodesia
 VQ4RF (via W4MCM)
 VQ5EK, W. Campling, Box 391, Kampala, Uganda
 VR4CB, Box 49, Honiara, Guadalcanal, Solomons
 VS9AB, c/o ISWL, 12 Gladwell Rd., London N. 8, England
 W2AYN/EP, Cdr. B. F. Borsody, USNR, USOM-Iran, APO 205, New York, N. Y.
 WA6KMT/KL7 (via W7TDT)
 WP4VWV, 1509A Messick Circle, Ramey AFB, Aguadilla, P. R.
 XE1XK, S. Sanchez, Box 726, DX Section, Guadalajara, Mexico
 XZ2BB, Saw Oo, Box 449, Rangoon, Burma
 YA2BC, P.O. Box 136, Kabul, Afghanistan
 YN6HH, Corinto, Nicaragua
 YU9IA, Box 91, Ploesti, Roumania
 YU1GA, Zmaj Jovina 26, Belgrade, Yugoslavia
 YU3DL, P.O. Box 382, Barquisimeto, Lara, Venezuela
 YV4BH, F. Salazar, Box 3172, Caracas, Venezuela
 YV5ANI, Box 11163, Caracas, Venezuela

ZG4AM (via G8GB)
 ZD1GM (via W3KVQ)
 ZD2JM (W/Ks via K9EAB)
 ZPSH2, c/o U. S. Embassy, Asuncion, Paraguay
 ZPSO0, c/o U. S. Embassy, Asuncion, Paraguay
 6OITUF, Box 16, Mogadiscio, Somalia Republic
 9Q5HW (to DL4HW)
 9Q5US, c/o U. S. Embassy, Leopoldville, Republic of Congo
 9U5a JH KU, P.O. Box 76, Kitega, Ruanda-Urundi
 9U5VS Box 62, Kigali, Ruanda-Urundi

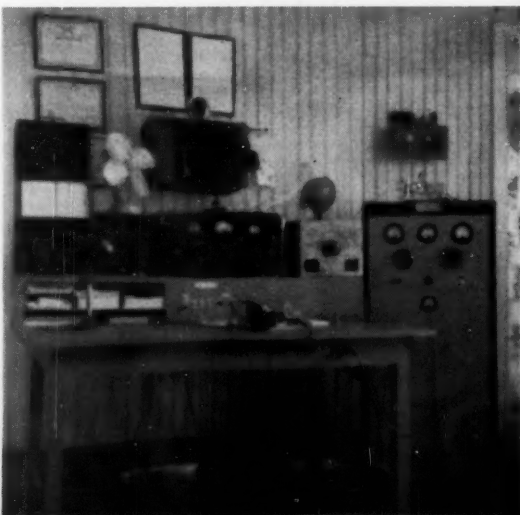
Probably some duds in the forerunning. If so, too bad — it's all in the game.

Whence:

Asia — "At present there are three BVI stations on the air," declares W4OSC of the BVIUS staff. "These also function as MARS stations and are operated by U. S. military amateurs. BVIUS is located in Taipei, BVIUSC in Kao-hsiung, and BVIUSE in Hain-chu. All have c.w., a.m. and s.s.b. equipment. It is understood that other BVs are active." KL7AZZ tells of one of these: "I was BV3HPT's 85th QSO, so possibly he will be quite active. He operates with 50 watts, and his weak signal possibly indicates need for antenna improvement." K1CRB writes W1LVQ from Vietnam where he hopes to fill a log or two with K1CRB/XV5 contacts. "There are seven or eight hams here in Saigon on government assignment." The authorization will be similar to that arranged by Yanks in Korea, Iran, etc. KA2CB returned to KIGAA/1 in August after "An excellent tour over there. DXwise, 149/127 — to be perfectly honest, I hated to leave! I believe I'll be even rarer DX as KIGAA/1, for in Japan I never heard Vermont on phone. Managed to pack five log books with KA2CB QSOs." W7DJU helped wandering G3JZI break the DX ice with his new label, VS6EN, on 20 c.w. AP2CR tells K6BX he expects improved 20-meter sideband results this autumn. "Your West Coast gang comes through very well around 1500 in autumn and winter. I currently attempt skeys with W7VEU on Wednesdays and Fridays at 1400-1500 GMT, 14,285 kc." VS9MB staffman Bob writes WITS of Gan Radio Club doings in the Maldives: "There now are four members — officer-in-charge Jim, Tony, Keith and myself. We are awaiting our DX-100 and shouldn't take long to assemble it. A triband three-element rotary beam also is on order to supplement our three dipoles. The receiver is an AR-88." Bob is 32, has spent 14 years with RAF, and expects to depart Gan around the end of the year. HL9KT's W9QPI admits, "We haven't been too active lately because of extensive rewiring and modernization of our gear. We've found that U. S. amateurs, particularly the Sixes, are quite polite on the air. But there are exceptions who persist in calling us during QSOs, especially on c.w." Asian adenda via W6DXC and FEARL (M): G3OFT hopes to revisit Qatar, Trucial states, Muscat & Oman, and Yemen one of these days. . . . A Bhutan DXcursion seems out of the question for 9N1s. It's a 24-day round trip via shank's mare. . . . KG6ICD crewmen hint another possible Marcus ruckus come January. . . . KA2s BM CB DE G1 and JG are closing down for Stateside return, while KA2s BS HL JL and JM prune and tune shiny new beams.

VP3AD watched the birdy while visiting at W1BB this summer. "Dad" and Stew conferred on their favorite subject, prospects for the pending 160-meter DX season. . . . At right is a view of VP3YG's DXCC installation at Georgetown. Des apparently is British Guiana's busiest c.w. man with 35 watts and an SX-28, 14 Mc. preferred.

(Photo via K2UYG)





YU1AG, Belgrade, is a world-wide favorite on 20 meters where Djuro has managed DXCC on c.w. and phone. (Photo via W7DJU) YU3EL, right, runs a well-worked homespun 150-watt and 12-tube superhet in Ljubljana. (Photo via W9WNV)

Africa — VQ4ERR, according to a press dispatch forwarded by G2RRS, was prominent among the many hams in Africa who sleeplessly volunteered emergency communication services during summer Congo difficulties. Amateur frequencies were widely depended upon to supplement missionary networks and other point-to-point circuits. Unlike the U. S. A., where the emergency-aid potentials of ARRL's well-organized traffic networks are officially recognized and utilized, most licensing authorities in Africa have never encouraged training and facilities for the event of such disasters. Radio Society of East Africa and VQ4ERR look forward to governmental enlightenment in this field so that amateur radio in that part of the world will be better prepared to serve effectively in future emergencies of any kind. ZD2JM intends to keep his three-807s 150-watt, Regfon receiver and "G5RV dipole" available in Lagos through 1963. K69NC and OZ3V understand that VQ4HT was to terminate his 15- and 20-meter c.w. VQ1HT activity in mid-September. "DXpeditions to the Indian Ocean area seem to be quite a fad," muses K2UYG, noting that GW3ITD, W4BPD, W0AIW and others intend to startle the DX crowd with DXotic prefixes this fall. ZS6IF plans to be ZS6IF/ZS9 around the clock on 7005, 14,010 or 21,015 kc. around the clock from November 5th through 14th. W44PL and 8KX. Local observations by EL4A (W7VCB): "Everyone doing a fine job here with Congo emergency traffic. ZD1AW says he may have to QRT in a few months because of a transfer. This would leave ZD1CM in great demand. EL4A may move diggings a few miles and hang up some 200-ft.-high sky hooks. Our West Africa net is quite lively on 7025 kc. each Sunday morning with EL4s FF4s ZD2s and 9G1s checking in. Forty meters really holding up fine here. I can work a pageful of 7-Mc. W/Ks almost any morning. A siege of malaria and some hunting excursions into the bush held down last month's QSO total to about 800." ZS7P says you're mostly likely to catch up with FR7ZD at 0300-0500 and 1200-1400 GMT. 14 Mc. WGDXC Rumadurundi rundown: 9U5DM likes 21,120 kc. a.m., 1700-2200 GMT; 9U5VS frequents 21,270 kc., same mode and time; 9U5KI haunts 21,240 or 21,265 kc., a.m., around zero hours GMT.

Oceania — Those 20-meter sideband schedules between Rabaul's VK9NT and W0EBG/W0LL have quite a story behind them. W0EBG, a WW-II reconnaissance pilot, was preserved from harm for months by Nakanai natives after being shot down over New Britain in 1943. Fred recently revisited the area and reports: "We have established the Airmen's Nantambu Memorial Foundation for the purpose of providing scholarship and educational aid to the indigenous people of New Britain as a memorial to the assistance given by them to personnel of the United States Air Force in World War II. The project will be administered through one of the mission groups in the Rabaul area. Considerable interest in this project appears to have developed among amateurs as a result of our schedules with VK9NT." W7CWE learns that VK8TF anticipates another VK8TF tour next year. VK9VM regularly skeds K2QXG on 14,070 kc., Fridays at 1100 GMT. Thereafter irregularly runs off a string of W/K QSOs. KC6TM says that KC6KR, employed in government communications on Koror, is the only native Micronesian now active on amateur bands. More will follow if Fr. Tom has his way with numerous youngsters in his tutelage. VK5BP and KL7AZZ revise our geography concerning last month's scheduled VK5BP/8 DXpedition. It's a 2,000-mile round trip, including only 400 miles K QSOs roads. "We decided to go by train." West Gullies provide more Pacific patter: VK8s AE AS EW GU NE OW PL ST TF ZG and ZDW are getting used to their new Northern Territory prefix in Alice Springs and Darwin.

. KC6AQ of the Western Carolines can be found working KG6NAB on Thursdays, 1130-1300 GMT, between 14,265 and 14,305 kc. USS *Hope*, with W80L/mm aboard, should soon dock in Indonesia, a very rare country by choice. VR1s E and F, of Tarawa and Ellice, are new "local" QRM for Funafuti's VR1D.

Europe — Scandinavian Activity Contest results for '59, issued by SRAL (Finland) list veteran ARRL Hq. DX chaser W1VG as top U. S. scorer (c.w.). Other call-area leaders are W2EQS, W3DBX, K4EX, K5LIA, K6DDO, W4DW, K9EAB and W8GDH, VE3HB and VO2NA led the Canadian contingent, OH9NC, LA4ND, OZ4FF and 8M5CCE scored highest home-country totals on c.w.; OH5QN, LA-6CF, OZ5JT and SM3AZI cleaned up on phone. Where were the Yank phone contesters? Not a single W/K/VE/VO miker applied. Reminder: The first week end of December is RSCT/28-Mc. Telephony Contest time. Circumstances details will appear here soon. That "DXCC"? No. 30 accredited to OK1GT last month more properly belongs to club station OK1KTI. Misinterpretation on our part. K2RYP writes from Crete: "SV0WT's new station building is up and our BC-610 and SP-600 soon will be moved in. We are now working 15 and 20 meters with a three-element beam fixed on the U. S. A. SV0s WC WN WO and WZ also are active here. WO being particularly workable on a.b. Myself, I will be returning to the States around December of this year." TF2WFF (K4APM) tells W1WQC he can be found on 14,030- or 21,030-kc. c.w., 14,186- or 21,245-kc. sideband, almost every week end commencing 2100 GMT on Fridays.

. Artist-sculptor-linguist LZ1AF calls K3CUI's attention to Radio Sofia's amateur program beamed our way on 9700 kc. at 0100 and 0400 GMT the first Friday of every month. LZ1AF has been hammering for twelve of his 28 years, and helped pioneer postwar amateur radio in Bulgaria from club station LZ1KAB. "My own usual operating time is somewhere between 2000 and 0500 GMT, 14 or 7 Mc., c.w. only." K3CUI notes in Russia's *Radio* magazine, U3CR DX editor, that U.S.S.R. single-sidebanders congregate at 0800 GMT on the first Sunday of each month, usually between 14,330 and 14,340 kc., led by UA5 1DZ 2CR and UB5KAB.

. K2TDI encountered excitement in a QSO with IMIRIF of Montecristo island. The latter reported a ship sinking afire, so Gene called his local Coast Guard who immediately relayed the distress message to proper Italian coastal authorities. In the IRTS (Eire) News we see that Eile 2Y 4AD 4th 6RD 9V and a.w.l. associates scored 580 QSOs with all continents during their May multiband DXpeditionary visit to the Blaakets as EI0AA. Indeed, such a ball was bad by all that they'll probably do it again.

Hereabouts — "DXCC"? No. 31 falls to W8NJC, noted Michigan DXer, second Eight to meet the simple stipulations on p. 29, July '59. W8ZAK 28KE 3ASK and 4ET pool talents to run a new string of VO4 ham programs. Up-to-date details are available at the address Amateur Radio, Box 922, Washington 4, D. C., and shortwave reception reports are welcomed. WA2-KMY has a candidate for the legendary Fastest Thing in The World: a contest c.w. QSO between TI2PZ and KH6IJ. W8KX opines that a DXpeditionary-type enterprise to Nicaragua and/or Guatemala would meet with wide favor among the c.w.-only gang. Walt grids for stepped-up DX competition from neighboring Grand Rapids W8s EW FEI and NOH. Maxim Memorial Station W1AW checked in for K6BX's Certificate Hunters Club diploma. Say, in addition to his Directory of Certificates and Awards as previously mentioned here, K6BX offers a quarterly *DX-QSL Newsletter* that could well lead you to check with VO4. W6KG signs on as DX editor for a prospective ham-type periodical engineered by W2NSD. W1s GPX and QLT are convalescing from their rugged



G83LAS, operated on the Isle of Man in April under Cambridge University Wireless Society auspices, QSOd 850 stations in sixty countries, 400 contacts with W/Ks. Here G3LAS parries a pile-up at Douglas.

Mexican reefs jaunt as XE9QLT/XE5. Next July they'll have a 100-watt c.w. rig along for better coverage on 20 and

40 meters. This year's QRP effort was mobbed by QRM Western Washington DX Club hosted a lively Northwest DX Get-Together at Seattle in late August W2GKE, K2s LSU and OQA rolled up a flock of midsummer St. Pierre contacts from FP8BM W7POU offers Utah skeds to DX stations on 14- and 21-Mc. c.w. G3LZQ Z86VK and VK7HK recently made the grade with Herb K4TEA, W8NOH and others suggest you check with Casa do Radio Amador Gaucho, P.O. Box 1119, Porto Alegre, R.S., Brazil, for specs on the C-80-S certifications awarded to North Americans who show proof of 30 contacts with PY3 stations.

Ten Years Ago in "How's DX?" — The J6KER is wild in the opening discourse for October, 1950, and we see a very miserable Jeeves walking the plank The DX market is bearish but reported DX is interesting enough. Twenty-c.w. features CS3AA, EK1AR, EZ4Y, FL8AC, HL1CB, MI3s AB IM, MS4FM, PJs 1UF 5FN, PKs 5AA 5JT 6CS 6LN, SU1UU, TA3AA, VK1s PG YM, VR5GC, VU7AH, YI2UW and ZC6AB The cream of the 14-Mc. phone crop: FN8AD, PKs 1DX 4KS 6CS 6SC, VK1-ADS, V87GR, 3V8s AT and BB ZD4AB is the only fancy item noted on 10 phone but, at the other end of the dial, CE3AG and FP8AC enliven 3.5 Mc. while VR2BZ and ZK1AZ/mm frolic on forty Among the miscellany: MD9AA produced Yemen QSOs for a handful of lucky Ws. Saarlanders appear with their new and distinctive 984 calls. W8NKK acts as QSL representative for undercover Netherlands Antilles PJ brethren. SSA of Sweden announces the 4th All-European DX Contest for November-December consumption Pictures of several KR6s, HK6JH and W9LM's fruitful antenna farm decoratively complement the commentary. **QST**

27th ARRL Sweepstakes — Nov. 12-13 and 19-20

Sweepstakes time again rapidly approaches. If you are located anywhere in the League's field-organization territory (see page 6), you are cordially invited to take part in this popular annual operating activity. Any amateur bands, phone or c.w., may be used. The total operating time allowed each contestant is 40 hours. Phone entries are compared only with other phone entries — c.w. scores only with other c.w. scores — in your particular section, in the competition for awards. Special Novice certificates are also issued. The week-end periods starting Saturday afternoon (2300 GMT) on the 12th and 19th of November mark the open season for SS contacts.

A complete announcement of the contest, including the rules governing participation, will appear in November *QST*. The rules will be the same as those of the 1959 SS. Amateurs in remote ARRL Sections who do not receive the next issue before the Sweepstakes may refer to November, 1959, *QST* for contest details.

Contest reporting forms will be sent to all amateurs who request them by mail or radiogram. It is not necessary to use these forms if the report form prescribed in November 1959 or in the next issue of *QST* is followed. CU SS?

Strays

Here is the October schedule for the Eastern MARS technical net.

AF-MARS Eastern

(Sundays 1400 EST: 3295, 7540 and 15,715 kc.)

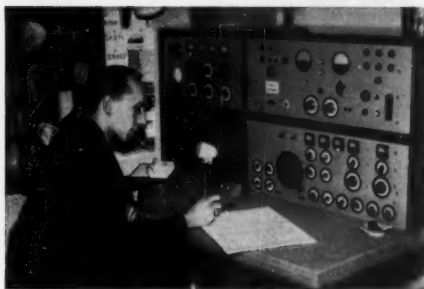
- Oct. 2 — Introduction to Solid State Devices; the Diode.
- Oct. 9 — Transistor Parameters.
- Oct. 16 — Transistor Circuits.
- Oct. 23 — Tunnel Diode Applications.
- Oct. 30 — Transistor Applications.

The first USAF-MARS Midwest Conference was held Aug. 21 at the Officers Club at Richards-Gebaur Air Force Base in Missouri. Key personnel among the 112 attending included the Chief, MARS, USAF; the MARS directors of Continental Air Command, Air Defense Com-

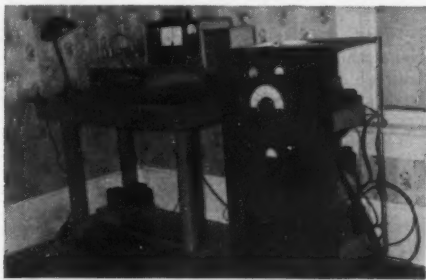
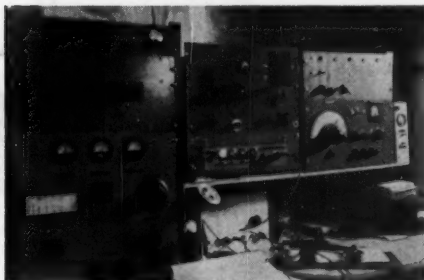
mand, Air Materiel Command, Military Air Transport Service, the Central Technical Net, Forbes and Schilling AFBs and the 33rd Air Division. Also present were the State Coordinators of Indiana, Illinois, Iowa, Nebraska, Missouri and Kansas with four Zone Directors and numerous Net Managers and NCS.

Capt. Charles R. Rinehard, AF0ZKQ discussed the question "Where Are We Going?" Capt. Bernard Yoffee, MARS Director of ConAC, answered specific questions on the entire MARS program. Lt. Col. George D. Meserve, W1FL/AF0WYK, State Coordinator of Kansas, organized the conference. Lt. Col. Zed W. Barnes, Deputy Chief of Staff, Communications-Electronics of the 33rd Air Division, welcomed the conferees. Members plan a similar meeting in 1961.

Home-built Stations



This pair of pictures displays some of the neatness for which our German friends are renowned. To the left is the home-built setup of ex-DJ2JB, who is now living in New Jersey and eagerly awaiting the time when he can obtain his U. S. citizenship and get back on the ham bands. His rig operated phone and c.w. on 80 through 10 meters at 250 watts. At the right is the station of VE3CTP, ex-DL1JZ. He runs 500 watts sideband, and even the high-voltage transformer and key are home built. The receiver uses separate converters for each band.



At the left above is another example of some of the fine construction done by VEs. This one is VE3AHU and, of course, he built nearly everything in the photo except the key and the mike. His transmitter ends up with an 813 modulated by a pair of 807s, while the receiver is an item that started out as a simple job but ended up with 16 tubes plus four separate crystal-controlled converters. At the right above is the station of W9UXW. His 11-tube receiver was built almost completely from his junk box, the only stuff he had to purchase being the band switch, some coil forms, and some decals. The cabinet was made from transcription aluminum, and even the dial is home made. The transmitter ends up with an 813, and it rests in a home-built rack. In addition, W9UXW built most of the relays and wound most of the transformers himself.



At the center of the "fourth largest city in Colorado," a city of 56,000 men and boys, 28,000 tents, and one burro, was KØBSA, the voice of the Fifth National Jamboree, Boy Scouts of America. Here, doing his share in snagging 784 QSOs with hams in 46 states and 14 countries, is one of 469 hams who signed the guest book—Steve Wood, K4FJO, of High Point, N. C.

Pedro, that one burro mentioned above, had his (hind) quarters ten feet from KØBSA, and ARRL Assistant Secretary W1UED, who was there, declares that the audio from that donkey was worse than the QRM on 751

I.A.R.U. News

THE photograph on the right may seem a little unusual for an IARU column. It is. On the other hand, readers of *QST* of about a decade ago will remember that it is a bronze statue, about four feet high, which was especially sculptured at the order of Jorge Delcasse, LU5CQ, given by him to the Radio Club Argentino and by it donated to the custody of IARU Headquarters to be awarded ten years later to the member society of IARU judged, at that time, to have contributed most to the development of coordination between amateurs. The statue has considerable significance, we were informed by the RCA; the feminine figure symbolizes the friendly spirit which exists in communications between amateurs of the world; she carries in her right hand leaves of laurel symbolizing the triumph of courage and in her left hand leaves of oak, symbolizing amateur friendship and co-operation.

Last fall, as a result of a vote among the societies of the IARU, the trophy was awarded to the Radio Society of Great Britain, on nomination of the New Zealand Association of Radio Transmitters, primarily for its work in establishing the Region I Bureau of the IARU during the past decade. It was a great pleasure of the Union Secretary, WIBUD, to make the official presentation at the 1960 Fourth Region I conference, at Folkestone, England, this past June (the statue itself was on the way via ocean freight).

Speaking of the fourth Region I IARU conference — it has been the pleasure of your Secretary to attend all but one of the series — it was the usual cooperative affair of a five-day gathering of representatives of European member societies of the Union. Fifteen societies were represented, with three more (E.D.R., O.V.S.V., and R.E.P.) being represented by proxy. The arrangements were excellent, the hospitality of the Mayor and city of Folkestone most gracious, and the discussions profitable. These resulted in a number of actions, including a thorough examination of the effects of the Geneva conference, advance planning for contact by member societies with their officials as the next conference approaches, and a host of matters having to do with mutual operation by European amateurs: Contest rules, awards and certificates, provision for a news bulletin, actions with respect to clarification of "Fox Hunting" contests (Hidden Transmitter Hunts to us on this side of the Atlantic), f.a.k. standards, etc. Secretary WIBUD was provided an opportunity to speak for approximately thirty minutes on some of the prospects with respect to the formation and conduct of the next world conference and some speculation on when it might



take place (roughly what was conveyed to the League's Board of Directors in May). A delicious banquet ended the sessions and was notable, as usual (from the American point of view), for the great number of toasts proposed and the resultant responses, which approached short addresses in most cases.

The photograph on page 75 includes most of those present.

EMERGENCY WORK BY AMATEURS OVERSEAS

Amateurs the world over are alike in their readiness to assist the local or national government, the Red Cross, and members of the general public in all sorts of emergencies, civil or natural. Here are reports from two International Amateur Radio Union societies on the work done by their amateurs during the serious emergencies of the past few months.

Belgium and the Congo

What is believed to be the most extensive emergency operation ever set up by the radio-amateurs has been in progress since the beginning of July.

When the Congolese armed force mutinied, the

Europeans living in this country were threatened in their possessions and lives.

Normal communications were disrupted, as well inside the Congo as between Belgium and its former African possession.

The amateurs were asked to step in and in a few hours several Belgian stations were ready to communicate with the Congolese amateurs. The Congolese amateurs had in the meantime taken advantage of the existing amateur and small commercial communication stations existing in large numbers to organize an internal communications net which proved to be very efficient.

Very soon a repatriation operation on an enormous scale began, with an absolute priority for women and children, so the families were broken up, and an even more acute need for radiocommunication arose.

In the meantime the number of Belgian stations used for the traffic to and from Congo had risen to about thirty, working mostly in the 21 Mcs. band, in fone, with powers ranging from 75 to 150 watts and beam antennas. The number of messages rose to several hundred daily. The Belgian administration helped by setting up a transmitter and a multiple receiving facility using rhombics, and giving the amateurs free use of the long-distance telephone for the delivery of the messages.

As a result, thousands of messages have been passed, giving news from Congo to the anxious families, informing the fathers of the safe arrival of mothers and children in Europe.

On several occasions, amateur radio saved lives by directing rescue parties to groups of Europeans besieged in farms or plantations, or to road-blocked columns of refugees attacked by the excited natives, and unable to raise directly the local authorities.

At this moment the operation is slowing down a little, as the amateur stations left in operation

in Congo become fewer.

In some places the local authorities try to impede this traffic, and the amateurs are forced to operate under cover. In other places, which had been abandoned, amateurs come back and resume operation.

It is foreseen that this operation will be continued as long as Europeans live in the Congo and normal communications are not restored.

The UBA has worked up to now as a message dispatching agency, and is at present setting up a powerful transmitter at its national shack ON4UB, to pass directly its share of the traffic.

The UBA wishes to thank the amateurs of the world who did their best to clear the upper part of the 21 Mc. band for this traffic, and have very effectively reduced the QRM.

—Joseph Mussche, ON4BK, President, Union Belge des Amateurs-Emetteurs

Chilean Earthquake

During the weeks subsequent to the earthquakes and seaquakes of the South that went through 10 of our 25 Provinces, we Chilean amateurs had certainly an extraordinary work creating a communication emergency net headed by the official station of the Radio Club de Chile, CE3AA, here in Santiago. During approximately eight weeks about 50 CE amateurs duly selected and authorized were working practically 24 hours a day substituting for all means of regular communications which had been destroyed. This emergency net was set between the frequencies of 7000 and 7100 kc. and it is not possible to relate even approximately the work that these CE amateurs had. It was so tremendous a volume of activity that it is difficult to tell of the numberless help given by amateurs, who saved lives, goods, and desperate situations.

Many foreign amateurs helped by sending

(Continued on page 162)

			F8MX		SM5MN		(?)		G2AIW		G3HRH					
			G5MR		G4QU		HB9PS		EI2W		SP5FM		PA0QC			
			SM5KV		G3DFG		G5QA		LA4ZA		G3BVG		LX1JW			
			Mrs. SM5CR		Mrs. SM5CR		G2DFG		W1BUD		EA4BF		G2UK		PA0DD	
			DL1XJ		SM5BMN		Mrs. G8TL		Mrs. G5QA							
G2MI			OH2TK		G8TL		Mrs. SM5CR		SM5CR		G2DFG		W1BUD		EA4BF	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD		Mrs. G6CL		SM5ZD		G3DQ		HB9GA	
G2MI			G2AIW		Smith-Rose		Mrs. SM5ZD									





CONDUCTED BY SAM HARRIS*, W1FZJ

PRACTICALLY all of my twenty some odd years of amateur activity have been spent on the v.h.f. bands. During that time, all of my v.h.f. activity, and all of yours too, has been ably reported for posterity in this column by Ed Tilton, W1HDQ. I have learned over the years to rely heavily on Ed's mature interpretation of the various problems which arise in the v.h.f. field. My efforts in this column will be directed toward maintaining the same high standards. I'm certain I'll have Ed Tilton's cooperation in my efforts. If I am to be successful, I will need yours. Please don't hesitate!

Speaking of hesitating, I hesitate to bring up such a controversial subject as tuning above 145 Mc. Nevertheless, the complaints received would indicate that many Technicians feel they are being neglected because the DX workers on the low end of the band are not tuning above 145. Surely, it must be recognized that the modern amateur-band-type communication receiver makes it impossible to tune more than $\frac{1}{4}$ Mc. or so at a time. Nevertheless, a dyed-in-the-wool DX worker will look for DX wherever it may be found. If there is DX to be worked above 145 Mc., the DX man will tune above 145 Mc. He certainly is not going to the trouble of moving his receiving equipment up to 145 Mc. in order to talk to a Gonset across town. You must remember that this is not a controversy about where he is going to tune, but rather a controversy about what he wants to hear when he tunes. It is perhaps unfortunate that some of the most consistent stations operating in the lower portion of the two

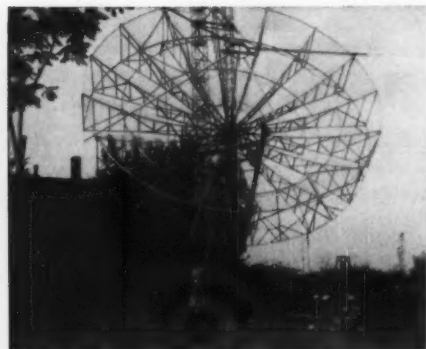
meter band are operated by people who have worked twenty to thirty or more states and whose prime ambition in life is to work all 50. The likelihood of them finding a new state above 145 Mc. is at present very small. It should probably be pointed out that the same stations do not answer calls from people on 144.3 Mc. either. They certainly have nothing against you as a Technician, but only against you as a state they have already worked. This condition is certainly not confined to two meters. It exists on any band where a DX precedent has been established. For instance, a W1 in Vermont is worth 50 W1's in Massachusetts. In any event, complaining never solves any problems. If you feel there is anything to be gained by having the stations on the low end of the band tune above 145 Mc., you must make your portion of the band more attractive to him than his portion. Don't make it too attractive, however, or he may move up there transmitter and all.

Project Moon Bounce, Echo 1.

We have received numerous reports on the reception of signals purported to have been reflected from Echo 1. Unfortunately, Echo 1 was launched during the peak of the Perseids Meteor Shower and the majority of the reports received are directly attributable to meteor reflection. The likelihood of stray reception of amateur signals reflected from Echo 1 is very small. In fact, the path-loss for Echo 1 is approximately 5 db. greater than the path-loss for a moon-bounce transmission. For amateur type communication, reflection from Echo 1 offers no advantages over the moon and has several disadvantages. The prime one of these is the rapidity of transit, which introduces considerable doppler shift as well as very difficult aiming problems. It is certainly safe to say that if you cannot receive moon-reflections, you will not be able to receive Echo 1 reflections.

Project Moon Bounce on 1296 Mc. at the R.S.V.H.F. Society has just been converted over to single sideband. I was privileged, after considerable effort, to finally hear a weak and wavy signal saying "Hello down there." Schedules are being maintained with W8LIO of Dorset, Ohio, and W6HB in San Carlos, California. Other schedules are invited.

Speaking of W8LIO, Jack of Dorset, Ohio, has constructed since the first of July a complete 1296 moon-bounce receiving station. A 20-foot homemade parabolic reflector mounted on an equatorial mount (see photo) represents an all



W8LIO's 20-foot parabola, on a polar mount. Small girl beneath dish is XYL, Idaho.

out effort on the part of Jack and anyone else he could scare up. The dish is built to a $\frac{1}{4}$ -inch tolerance and exhibits a gain and beam width consistent with a dish of this size. The receiving setup consists of a homemade version of the Microwave Associates paramp used at W1BU. Reception of W1BU at Dorset, Ohio, is adequate to allow rebroadcasting on 40 meters so that we can hear our own signals coming back. To date no voice transmissions have been accomplished. The exciter for the transmitter at W8LIO is under construction and will probably be on the air by the time you read this. Plans are to use an RCA 7650 in the final running about 300 watts output. While Jack is no newcomer to the v.h.f. region, this is the first v.h.f. project on which he really bore down. It is obvious that prospective moon bouncers should look to Jack for advice on how to do it yourself.

New South American 50-Mc. Beacon

Beginning early in September we will have what should be a reliable indicator of DX possibilities to the region around Lima, Peru, about 12 degrees south of the equator. OAAAGI will be running a kilowatt transmitter 24 hours a day on c.w., on 50.04 Mc. The antenna has 12 db. gain, and will be aimed this way. Though no formal observing program has been set up for amateurs in connection with this station, ARRL would be glad to have reception logs.

The operator will attempt contacts when conditions appear favorable, but he may not always be on hand. The beacon station is located about 20 miles from his working site.

Strange-Signal Reports, 50 Mc.

Three new reports have shown up in the Strange Signal Department. The first of these from Keith Knowlton, K1JPH, who reports hearing the signal many times during May and June. While the signal can be peaked, it always peaks on different frequencies but covers the entire band. Keith has peaked the signal as low as 50.45 Mc. and as high as 52.75 Mc. with signal strength varying from 40 db. over nine to 60 db. over nine on his HQ-170C. Frequently he has noticed a peculiar "popping" out to either side of the peak. No carrier, 'cause neither b.f.o. nor v.f.o. will beat against the signal.

Another report from Joey Cooper, K4PZJ, Memphis, Tennessee, gives us the southern view of strange signals heard since the middle of June. Joey and other six-meter operators in his area have noticed that the carrier and its regenerations appear almost every time the band opens, and cover close to two megacycles. It has a slight constant oscillation.

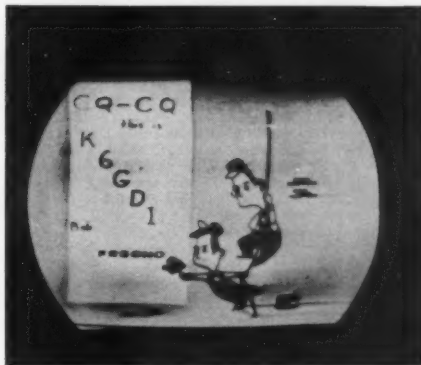
From the midwest and Missouri, Bob Golsong, K8SHN, reports that on August 2 the signal peaked to the south at 50.8 Mc. He finds that the "loud beeping tone peaks where the signal is the strongest" but the "loud rushing sound is just off to the side of the peak signal."

W0ALA, K9RIC and K8SHN all peaked the signal on the same night and at the same time and found it to be the same direction and frequency for all three of the stations. They find that it will cover a six-meter signal but no heterodyne is heard.

Miscellaneous Activity

Despite remarks of K7DNK/VO concerning no activity on 50 Mc. in that area, we learn from VO1EC that there is considerable activity; in fact as many as seven VO stations operating 50 Mc. at the present time. These stations as listed are VO1DW, AE, AO, EC, AU, CZ and AK, most of whom have been active during the spring and summer openings. The best of the openings from VO-land were, in all probability, the ones during the evenings of August 3 and 4, when the boys way up there worked stations in W1, 2 and 3 call areas, and heard one W4 plus one W8.

Berry made the same complaint we all seem to be making, but knowing that such comments "cannot possibly be di-



Amateur TV is not confined to Ohio. It abounds in California also.

rected at me," do nothing about it. In his own words: "A good number of the W stations were involved in a real pile-up just inside the band edge trying to work VO1DW on his frequency, while VO1AO on 50.7 and VO1EC on 50.4 had relatively few contacts. It would appear that good operating practice and close listening would have produced more contacts." We agree a hundred per cent, but also know that feeling when a seldom-heard area comes through on 50 Mc. A fella is just scared to death to tune that receiver after hearing the call area he's never heard before. The band might be loaded with other stations from this new area, but just what if it isn't? And what if he gets away? Now is the time, when DX is scarce, to try to get into the habit of tuning, tuning, tuning, past the DX station already in contact with someone else, and see if you can't be the one to dig up a brand new station for your very own.

VO1DW is hard at work on a two-meter rig, while VO1EC already has one ready to go running five watts. While the boys do not feel there is much DX to be expected on 144 Mc. at their location in Newfoundland, VO1DW is mightily interested in the possibility of working with the Gs on two meters.

Another of our esteemed neighbors VE2AIO assures us that there has been and will continue to be serious activity on 50 Mc. in the Montreal area. As has happened to many of our v.h.f. enthusiasts, Geoff became "fed up" with the low frequencies, came to six meters, and is once again rarin' to go. He is running 25 watts output c.w., a.m. and a.s.b., with v.f.o. control to a 5-element beam at 55 feet.

Geoff started consistent operation on 50 Mc. during April of this year, but as he says "found life difficult on c.w.", and had much better luck on a.m. Wonder what the difficulty was! He prefers c.w. or a.s.b. to take advantage of weak signal circuits but does work a.m. and will move up in frequency for anyone tuning only around his own frequency. This may be going too far Geoff, how will we ever get the boys to tune if you're a gonna do things like that?

High power, to the tune of 100-watt output amplifier, is in the works at VE2AIO, and will eventually grow in power output. On May 15 Geoff had a contact with K6QOZ and on August 1 heard W7RUX at 1950 EST and also W5IVV, both working into the middle west. Both had pronounced flutter.

VE2AIO operates between 7:30 and 11:00 p.m. every evening and between 0800 and 1000 a.m. week ends around 50,060-50,100 Mc. VE3RM operates at 50,028 during saturdays with Geoff every Saturday and Sunday morning. Very glad to hear of the activity in Canada, particularly as we can't get it over the air very frequently.

According to K4PZJ activity has improved in the Memphis area during the last two weeks of July; band openings helped, as during this time Joey worked twenty, count 'em, twenty states and Puerto Rico.

Word from W3RUE, Ted Fabian, reports contact with VE8BY on August 7 at 0145 EDT on 50.016. Only other DX stations at that time were VE4CV and a VE3. Signal of the VE3 was so fluttery that Ted could not get the call.

Said it sounded like a combination of aurora and back scatter.

KL7FLC is now operating from drift station Bravo at 50.04 Mc. They are operating on a 24 hour basis using automatic keying. Tests on 144 Mc. will be on request only.

KL7AUV reports reception of the Ice Island signal between 2300 and 2330 Alaskan time, Aug. 17, by KL7DKN. KL7AUV worked KL7FLC at 2200 Aug. 19, for about 17 minutes, and he was heard by KL7CDG around 2330 on the 20th. Also on the 19th, W7RT, Seattle, heard the automatic transmission of KL7FLC for about 5 minutes beginning at 2345 PST. The signal was 89, with only a trace of aurora flutter, but it lasted only a short time. The signal was strong when John first heard it, however, so it may have been in for some time.

VE8BY, Yellowknife, NWT, reports reception of KL7FLC at 0620 GMT Aug. 20. He was calling CQ at the time, and was 89. K0UDZ was heard calling KL7FLC, but no contact was heard. Beam headings were due west for KL7FLC and southeast for K0UDZ. So far, VE8BY has worked VE 3, 4 and 5 and W 2, 3, 7, 8 and 9. His work has all been done when aurora was present, but signals are not badly affected by auroral propagation.

Gib sends us more reports on activity from VE8BY. Gib? Everybody knows who that is, W6BJJ of course. On July 28 Pete worked a few VE's, then W's and 9's, next VE's and finally W7. Period lasted from 0330 to 0630 GMT, July 29. He worked VE5VL on A3, and K0DMZ, K7EGN and K7CBS on c.w. Pete, VE8BY, is running a 2E2B, 5-element beam 55° up at Yellowknife. His frequency is approximately 50.015 Mc.

No skip signals were heard in Fresno that night as far as can be learned. Looks like some of us are just a gonna have to change QTH to get that VE8 contact. Many thanks Gib, we'll be looking for both you and Pete.

Clubs and Nets

As usual the v.h.f. clubs around the country keep getting bigger, better, and newer ideas; activities which will keep the club members active and on their toes at all times.

The North East Oklahoma VHF Society is striving manfully to get all members mobile by having hidden transmitter hunts frequently. Several of the boys are converting commercial single sideband units for use on six meters; others are discussing (at the present time) the possibility of building transceivers for 3000 Mc. or thereabouts.

Jerry, K5ZGV, is working on a circuit for said transceiver. Sounds like this group is really go-go-going.

The Lynchburg Amateur Radio Club of Lynchburg, Virginia, has completed its directory of Wide Band FM Nets, and anyone interested may obtain one from Tom McKee, K4ZAD, 508 Oakridge Ave., Lynchburg, Va. The directory has a number of choice bits of information concerning many phases of operating f.m. besides a list of stations, frequencies and QTHs.

The Houston Area Six Meter Net has also put out a directory which includes name, call, QTH and phone number of each of their members, and also information on the certificate issued by the club.

144 Mc.

144 Mc., not to be outdone by such upstarts as 420 Mc.

2-METER STANDINGS

Figures are states, U. S. call areas, and mileage to most distant station worked.

WIREZ.....	32	8	1300	WSWV.....	10	3	600
WIAZK.....	28	8	1205	WSUN.....	6	3	1200
WIKCS.....	24	7	1150	WSYYO.....	4	3	1330
WIRFL.....	23	7	1120				
WIAJR.....	23	7	1130	W6WSQ.....	14	5	1390
WIMMN.....	21	7	1090	W6NLZ.....	12	5	2540
WIHDQ.....	21	6	1020	W6DNG.....	9	5	1040
WIIZY.....	20	7	1180	W6JAF.....	6	3	800
KICRQ.....	19	6	800	W6ZL.....	5	3	1400
WIAFO.....	17	6	920	W6MMU.....	3	2	950
KIAFB.....	17	5	450				
WICLH.....	17	5	450	W7VMP.....	15	5	1280
				W7JRG.....	13	4	1040
W2NLY.....	37	8	1390	W7JLM.....	5	2	670
W2CXY.....	37	8	1360	W7LHL.....	5	2	1050
W2ORI.....	37	8	1320	W7JJP.....	4	2	900
K2GQI.....	33	8	1200	W7JU.....	4	2	353
W2AZL.....	29	8	1050				
K2IEJ.....	27	8	1060	W8KAY.....	38	8	1020
W2BLV.....	27	8	1020	W8SDJ.....	35	8	990
W2AMJ.....	25	6	960	W8PT.....	34	8	985
W2DWJ.....	23	6	860	W8IFX.....	34	8	980
K2HOD.....	23	7	950	W8LOF.....	33	8	1060
W2PAP.....	23	6	753	W8SPG.....	29	8	1040
W2ALR.....	23	6	960	W8RMH.....	32	6	910
W2RXG.....	22	7	1090	W8SVI.....	30	8	1080
W28MX.....	22	6	940	W8EHW.....	30	8	860
K2CEH.....	23	8	1200	W8LPD.....	29	8	975
W2LWL.....	21	6	700	W8WRN.....	28	8	680
W2ESX.....	20	6	750	W8BAX.....	29	8	960
W2WZR.....	19	7	1040	K8XU.....	27	8	1050
W2UTH.....	19	7	880	W8NOH.....	26	8	975
W2RGV.....	19	6	720	W8DX.....	26	8	720
K2RLO.....	17	6	980	W8ILC.....	25	8	800
				K8JW.....	25	8	940
W3RUE.....	32	8	1100	W8GFN.....	23	8	540
W3GKP.....	31	8	1180	W8LCY.....	22	7	680
W38GA.....	30	8	1070	W8BLN.....	21	7	610
W3TDF.....	29	8	1050	W8GTK.....	17	7	550
W3KCA.....	28	8	1110	W8NRM.....	17	7	550
W38GA.....	27	7	700				
W3EPE.....	22	8	1000	W9KLR.....	41	9	1160
W3BYF.....	22	6	660	W9WOK.....	40	9	1170
W3LNA.....	21	7	720	W9GAB.....	34	9	1075
W3NKM.....	20	7	730	W9AAC.....	32	8	1050
W3LZD.....	20	7	650	W9REM.....	31	8	850
				W9ZIH.....	30	8	830
W4HQJ.....	38	8	1150	K9AAJ.....	27	8	1070
W4HHK.....	36	9	1280	W9LYC.....	27	8	950
W4ZLJ.....	34	8	950	W9EQC.....	27	8	820
W4LTU.....	34	8	1160	W9PHI.....	27	8	820
W4AO.....	30	8	1120	W9UJL.....	26	8	910
W4UMF.....	28	8	1110	W9BPV.....	25	7	1030
W4VLA.....	26	8	1000	K9AQF.....	24	7	900
W4DQJ.....	25	8	1040	W9LFP.....	22	7	825
W4WNH.....	24	8	850	W9KPS.....	22	7	690
K4UES.....	24	6	765	W9CUX.....	21	7	800
W4CJ.....	23	6	725	W9OEX.....	20	7	850
W4VVE.....	21	6	720	W9PMN.....	19	6	800
W4RMU.....	20	7	1080	W9ALU.....	18	7	800
W4TLV.....	20	7	1000				
W4IKZ.....	20	6	720	W0BFB.....	32	9	1180
W4OLA.....	20	6	720	W0SMJ.....	29	9	1075
W4AIB.....	21	7	880	W0IHD.....	28	8	1030
W4CPZ.....	18	6	650	W0QIB.....	19	9	1300
W4RFB.....	18	7	820	W0RUF.....	23	7	900
W4MDA.....	17	6	750	W0INI.....	21	6	830
K4YUX.....	16	8	830	W0UOF.....	21	6	800
W4LNG.....	15	6	1080	W0TGC.....	21	7	870
				W0RYG.....	20	8	925
W5RCI.....	34	9	1215	W0IC.....	19	7	1245
W5AJG.....	29	9	1360	K9ACJ.....	16	6	1120
W5ALU.....	28	9	1300	W0IFS.....	16	6	1100
W5LPG.....	25	7	1000				
W5PZ.....	25	8	1300	VE3DIR.....	30	8	1330
W5FTY.....	23	9	1250	VE3AIB.....	28	8	1340
W5KTB.....	23	12	1200	VE3BQN.....	19	7	790
W5JWL.....	19	7	1150	VE3DER.....	17	8	1340
W5ML.....	16	5	700	VE3AGG.....	17	7	1300
W5FSC.....	12	5	1390	VE3HW.....	15	7	1350
W5HEZ.....	12	5	1250	VE3AOK.....	13	5	550
W5CVW.....	11	5	1180	VE3BFB.....	16	6	715
W5NDE.....	11	5	625	VE7FJ.....	2	1	365
W5VY.....	10	3	1200	KH6UK.....	1	2	2540

220- and 420-Mc. STANDINGS

220 Mc.							
WIAZK.....	9	3	412	W4UBY.....	7	5	320
WIHDQ.....	11	5	450	W4UMF.....	11	5	420
WIOOP.....	12	4	400	W5AJG.....	3	2	1050
WIRFL.....	15	5	480	W4RCI.....	8	5	700
WIUHE.....	11	4	385	W6NLZ.....	3	2	2540
W2AOC.....	13	5	450	K6GTF.....	2	1	240
K2AXQ.....	8	3	230	W6MMU.....	2	2	225
K2CBA.....	10	4	325	K7ICW.....	1	1	250
K2DIG.....	4	3	140	K8AXU.....	10	5	1050
W2DWJ.....	14	6	740	W8IJG.....	9	5	475
W2DZA.....	12	5	410	W8LPI.....	6	4	480
K2KIB.....	9	3	200	W8NRM.....	8	4	390
W2LRL.....	10	4	250	W8PT.....	10	5	550
W2NTY.....	10	4	200	W8SVI.....	6	4	520
K2PPZ.....	11	4	190	W9AAG.....	9	4	600
K2QJQ.....	10	4	260	W9EQC.....	11	5	740
W3AHQ.....	4	3	180	W9JCS.....	5	2	340
W3FEY.....	8	4	296	W9JPF.....	9	4	540
W3KCN.....	10	4	255	W9OVL.....	6	3	475
W3LCC.....	8	5	300	W9UED.....	4	4	605
W3LZD.....	15	5	425	W9ZIH.....	10	5	500
W3RUE.....	7	4	225	K0DGF.....	3	3	425
W3UGJ.....	11	5	400	K0ITF.....	6	3	515
W3ZRF.....	5	4	112	KH6UK.....	1	1	2540
K4TFU.....	8	4	400	VE3AIB.....	7	4	450
420 Mc.							
WIHDQ.....	8	3	210	W3RUE.....	7	4	320
WIMFT.....	4	3	125	W3HKK.....	3	3	550
WIRFL.....	7	4	410	W4VVE.....	6	4	410
WIOOP.....	10	3	390	W5HTZ.....	3	2	400
WIUHE.....	6	4	430	W5RCI.....	6	3	600
W2AOD.....	6	4	280	W6CTG.....	2	2	240
W2BLV.....	12	5	360	W7LHL.....	2	1	180
W2DWJ.....	7	4	196	W8HCC.....	3	2	355
K2CBA.....	5	3	225	W8JCS.....	3	2	250
W2WJL.....	5	3	130	W8JLJ.....	4	2	275
W2NTY.....	3	2	100	W8NRM.....	3	2	390
W2OTA.....	6	3	150	W8RQI.....	4	2	270
K2UTB.....	7	3	175	W9AAG.....	5	3	375
K3EOP.....	6	3	250	W9GAB.....	9	4	600
W3FEY.....	5	2	225				

and 1296 Mc., comes in this month with at least twelve changes in the "States Worked" column. The first reason for this upward trend in states worked was caused by a phenomenal two-day tropo opening which extended from the east coast to Nebraska, Kansas and Missouri. While this opening caught most of the New England 144-Mc. operators with their beams down for summer modification, our old standby, WIREZ, and K1GSR were in there pitchin' all the time. I guess Ray didn't get any new ones on this opening but he did open the way for Al, K1GSR, to contact W9QXP in Illinois at 0610 GMT, August 2, 1960 and then into W0BFB in Mitchellville, Iowa, at 0700 GMT and then W0EMS in Omaha, Nebraska at 0727 GMT. Signals from W9QXP, Jerry, peaking 5-8-9, W0BFB peaking 5-8-9, W0EMS running 4-5-9. K2KIB was hearing W0QDH, Kansas; W0BFB, Iowa; W0EMS in Nebraska. Jim managed to make a good contact with W9QXP/9. Jerry was on phone and reading 5-7 at Jim's house.

A little farther south, the fathers of amateur radio moon bounce, W3GKP, Spencerville, Maryland, and W4AO, Falls Church, Virginia, both contacted W0EMS in Omaha, Nebraska. Smitty was hearing W0BFB and W9QXP also. He reported W0EMS as being 5-5-9, c.w., naturally.

The same opening gave Mac, K2CEH, a new state when he managed to contact W0QDH, W0YMG and K8-AQJ, all in Kansas. He also contacted W0ZVY and K0HVP in Iowa.

Old Larry, W2ALR, not to be caught napping by such a close neighbor, also managed to work W0BFB and W0EMS. At least three of the reports received on this opening gave credit to Art, W8KAY, for his sterling efforts in alerting all and sundry. Certainly Art deserves a round of applause for his "QST-QST de W8KAY, look on such and such frequency for so and so." I am sure that many people would love to do the same service for Art if they could just hear something that he didn't hear first.

W9AAG, Woodhull, Illinois, started his activities on this opening on the evening of July 31. At around 11:00 p.m. (Heaven knows what time that is in GMT) Dallas noticed some carriers on strange frequencies and after swinging the beam identified W0YMG and W0ZJB. Naturally he worked them and arranged a schedule for the next morning at 7:00 a.m. At about 8:00 a.m. on August 1 a Confederate accent was spotted and finally identified as W5YYO at Borger, Texas. (Worked him too.) That evening W0EMS was raised and around 8:00 p.m. W3FPH was heard working W0DEN at Iowa City on phone. As nothing else east of Ohio was heard at the time, Dallas fired up on 432 Mc. working W9ZIH and W9OJI and between 10:30 and 11:20 CDT worked W8JLQ and W8RQJ at Toledo, Ohio. Slipping back up to 144 Dallas then spotted W5TZ in Oklahoma and heard Ray, WIREZ, QSOing Jerry, W9QXP. Unfortunately, as usual, Dallas was caught in the middle of a good opening where everyone was hearing everyone but him.

An interesting sidelight on tropospheric propagation comes from Mac, W5MVL, El Paso, Texas. Mac has been keeping schedules over a couple of mountain ranges to Roswell, New Mexico. Schedules started on July 12 and improved nightly until on the 21 of July signals were running 10 to 15 db. over 9. This was the time of the month in which the KH6UK — W6NLZ 432 Mc. trans-Pacific transmission was made as well as the same date on which the 1296-Mc. moon contact was made. From that date on the signals over the mountainous path continued nightly to become weaker and weaker until on the second of August no contact could be made on c.w. Looks like those Easterners were borrowing your transmission path. Old Jess, W4AIB, Aiken, South Carolina, finally opened up the two meter band to W8BKI, Charleston, West Virginia. This 335-mile haul across the Alleghenies has been spanned several nights running and looks like a good summer time path anyhow.

Perseids and Shower

All the reports on the Perseids Meteor Shower are not yet in but apparently satisfactory to a number of people. (It is interesting to note that no 50 Mc. meteor scatter reports were received.) Jay, W5JWL, was glad to complete QSOs with W0AZT, W0MOX, W0ENC. Practically no signals received from the northeast-only station heard was K2LMG. Out in W6-land Mel, W6WSQ, managed a contact with W6LIT/0, Scotts Bluff, Nebraska. This was the first Nebraska — California 144 Mc. contact.

W7JRG and W8PT completed the first W7 — W8 144



Ernest Manly, W7LHL, operating the northern end of the 265-mile 10,000-Mc. circuit. The site was Green Mountain, Washington. W7JIP was on Marys Peak, Oregon, for the new record.

Mc. contact on August 12. Jack's signals were reported rock solid and a quick exchange of reports and calls which lasted about 45 seconds.

Jim, K2KIB, picked up W4HHK on the 10th of August and W4RMU in Florida on the 13th of August.

Comments from the New England Perseids schedulers are unanimous in proclaiming this year's shower a dud. Several schedules kept on 220 Mc. but no results.

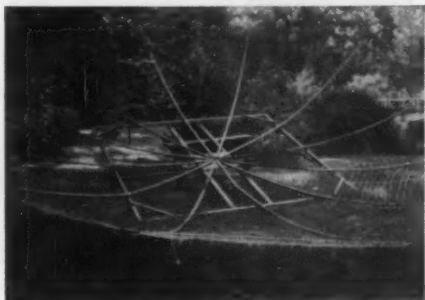
10,000 Mc. Record Broken

On July 31 W7JIP/7 operating on top of Mary's Peak near Corvallis, Oregon, and W7LHL/7 on Green Mt. near Granite Falls, Washington, made a two-way contact on 10,000 Mc. at 0620 PST using A2. At 0624 PST they went to A3 and kept in contact until 0900 PST. This distance is 265½ miles. Ernie was assisted by W7PVZ, W7TWX, K7IPI, and his ten-year-old son, Jimmy.

220 Mc. and up

While the two-meter boys were making hay on the August 1 opening, W8PT was having a dandy phone contact with K2CBA on 220 Mc. With almost nightly openings across Lake Michigan and down into Ohio, Jack has really kept things humming on 220 Mc. and 432 Mc. (Not that he let anything slip by on 144 Mc.) No comment from Jack on the ideal 220-Mc. frequencies. He's too busy working 'em where he finds 'em to worry about where the band should be. Incidentally, the consensus so far on 220 Mc. seems to be that the band should be somewhere between 220 Mc. and 225 Mc. No definite preference anywhere in particular. Bob, W9GAB, complains that only moderate range signals up to 400 miles have been appearing on 432 Mc. weekly. Bob is conducting schedules with W8JLQ.

(Continued on page 158)



\$30.00 cash built this for Al, K2UYH.



W9HRI, one of the mobiles in Operation Alert at Eau Claire, Wis.

Working Together in Civil Defense

Operation Alert 1960

BY GEORGE HART, WINJM*

WE think OCDM must have the same troubles with Operation Alert that we have with our annual Simulated Emergency Test.¹ Things are tough, everybody is busy, there is more work to be done than can be done. Then all of a sudden someone remembers that it's almost time for another annual test and everybody tumbles all over everybody else trying to get things arranged in time.

We're just guessing, mind you. This year's OPAL was first mentioned to us in March, the copy of the standards arrived in mid-April and the test was held in early May. Both RACES and AREC participation were welcomed. We asked ECs whose groups took part, whether as AREC or RACES, to let us know what they did, informally. Believe it or not, at the time of writing this copy (early August) we are still getting reports of participation, most of them apologizing for being "a little late." That's the reason for the write-up being a little late, too; anyway, that's the best excuse we can think up at the moment.

And so to work? Well, it looks as though we heard from 28 states this year, two states better than last year. Of course *all* states took part, but 28 is the number we heard from. There was no amateur participation in the conelrad alert this

year. (Personally, we think they're still trying to dig out from under that avalanche of reports we amateurs sent them last year.)

Incidentally, there was some misunderstanding about the conelrad alert. Although we mentioned in *QST* that it did not apply to amateurs, that only the broadcast services were required to observe it, we afterward received a number of letters "reporting" amateurs who kept on merrily transmitting while the alert was in progress. Some harsh words were exchanged on the air, entirely unnecessarily in view of the facts. Next time we'll use larger print.

Some of the reports were complete and detailed. Some were quite sketchy. A few we picked up from club bulletins and miscellaneous publicity releases.

Eight states reported this year which did not submit reports last year: Ark., Ga., Iowa, Ky., Okla., Penna., Vt., Wash. Seven states and two Canadian provinces heard from last year have no reports in the file this year: Ala., B. C., Kans., Me., Mo., Mont., Sask., S. Dak., Va. So we come out about the same, after all. Here's the roll call of states, with a brief summary of the OPAL activities in each:

Arkansas

Members of the Arkansas River Valley Amateur Radio Club participated in OPAL as the RACES group of Pope County C.D., relaying Radeif information from high schools to state c.d. headquarters. Four members were active. — W5KBH, EC Pope Co., RO and Secy.

California

W6DEF, EC Redwood City, reports that weekly c.d. check-ins continue in stride and that only the RACES people were active in OPAL. C.D. officials did not participate.

Connecticut

The AREC and RACES of Cheshire took an active part in OPAL with four amateurs and nine RACES operators on deck. We also received a book of four messages from amateurs in Watertown, Harwinton, Torrington, Richfield and Terryville merely stating that they were on, no details.

The Guilford RACES station, W1KAT, was on for 10 hours on May 3, handling 25 messages. Four amateurs did most of the work.

Newington RACES was active under RO W1DXT, taking part in the area drill. Five amateurs participated.

Florida

The usual good turnout. We have a concise report from W4UHY, who is state c.d. director of communications.



At the Control Center of Pope County (Ark.) RACES are (l. to r.) W5WSM, K5OJB (rear), K5PMB and W5KBH (RO).

The state RACES network functioned on 40 c.w., 40 phone and 80 c.w. alternatively as conditions changed. The mobile communications center was parked in front of the state control center. County RACES organizations which were active included those of Orange, Pinellas, Brevard, Palm Beach, Osceola, Lake, Broward, Okaloosa, Manatee, Dade, Escambia and Volusia Counties. AREC and RACES worked in the closest cooperation; as an example, all 22 operators in Orange were AREC members, and this group did an outstanding job. W4UHY estimates that approximately 250 amateurs participated in those counties which reported, and close to 400 amateurs throughout the state. Operation at county level is all on v.h.f. Thanks to W4UHY for a fine statewide summary. We wish also to acknowledge individual reports from Orange County (W4NKD), Okaloosa County (31 amateurs under RO W4RKH and EC W4BPJ) and Broward County (K4PPX).

Georgia

EC K4BPQ tells us that Clark County took part in a widespread activity.

Hawaii

In the Hawaiian exercise, all inter-island messages between c.d. agencies and most emergency reports and orders on the island of Oahu were handled by the amateurs in the state c.d. net in daily sessions from 0800 to 1800. Our report comes from KH6ARL, who lists twelve amateur participants.

Idaho

Believe it or not, we have a report from Moscow. W7VQC held down the fort in that city (in Idaho, that is) and centralized activity in several other Northern Idaho points. Public service and utility agencies were superlative in their support of the alert and cooperation with the amateurs. W7QEL was an energetic worker in Northern Idaho, without whom little could have been done.

W7DPD in Arco was active three days in a row, in contact with Boise and handling much traffic for his c.d. people.

W7EYR held down the job of maintaining communication with Boise from Canyon County C.D. in Caldwell, assisted by W7OL and a relay by W7PCP in Nampa. He says that 2 meters is the most dependable band locally and that 75 and 40 meters did not stand up well.

Illinois

Chicago Area RACES had 2 mobile control centers and 3 communications control centers in operation on nine frequencies under the direction of RO W9SPB. Eight different control centers were used, and during the alert one of them was visited by the mayor, the Illinois c.d. chief and the Chicago c.d. director. It was a good turnout. — W9STR

W9IFA reports activity from Greene, Jersey and Calhoun Counties where amateurs worked with c.d. police and fire personnel, using two meters.

Evanston RO W9BUK reported by radio that Evanston held their OPAL 60 on May 8, using twenty operators in three nets.

Nine amateurs manned the gear at K9KHN, the St. Clair County c.d. station, throughout the alert. Frequencies on 75, ten and two meters were used. Everything went smoothly. — W9JMY, EC.

Indiana

OPAL in Jay and Delaware Counties was held on May 1 by the AREC of those counties in order to take advantage of the week end. The activity simulated a tornado and was supervised by W9SNQ, EC for Jay County.

The Vanderburgh County RACES group monitored for the CONELRAD alert during OPAL.

A book message from four stations in Seymour indicates activity at that point, but no other information.

Iowa

Our sole source of information on Iowa activities is a club bulletin of the Sioux City Amateur Radio Assn. Therein, it is stated that RO W9FZO called the area RACES net at 1230 on May 3 to collect fallout information for Northern Iowa. Much difficulty with band conditions on 75 meters was experienced, but after collecting all information avail-



W7EYR, at the controls of the RACES station at Caldwell Idaho, for Canyon County OPAL.

able, W9FZO finally succeeded in passing it along to K5KDA/# on 3990 kc.

Kentucky

The AREC of Owensboro, Ky. (Davies County) took part in OPAL on May 5. Five mobile stations and seven home stations were active, with a traffic count of 32. C.D. officials were impressed with the drill, which lasted one hour. Nets were set up on 75 and ten meters, passing simulated messages dealing with refugees from Louisville, Henderson and Evansville. Twenty AREC members took part. — W4VJV, EC Davies Co., Ky.

Massachusetts

Winthrop RO W1BB came through with his usual fine report. Operation was 100%. Sixteen stations and 28 people did the job locally, with all battery-powered equipment functioning perfectly. Net control was at the town hall. Two and six meters were used for inter-area and sector drills, with all traffic being handled promptly and accurately. The Alert warning was received and sirens sounded through the RACES net.

Michigan

Washtenaw County EC and RO W8JYJ submits a good report on their activity. The county c.d. bus was used as net control in a May 3 drill lasting from 1300 to 1430, with sixty messages handled by twelve participating amateurs. On May 4 the net was reactivated at 0830 and over 100 messages were handled on that date, with 14 amateurs taking part. A great improvement was noted over last year's drill.

Muskegon County RACES and Red Cross combined for the operation in that area with six networks on 80 c.w. 75 phone, 10, 6 and 2 meters. The six meter group provided a tie-in with western Michigan areas and also with state in Lansing. All traffic was efficiently handled. All communications were under the direction of W8UCG, who is director of communications, RO and EC.

Minnesota

At 1200 on May 3 the RACES network of Minn. Area III began to handle c.d. simulated emergency traffic. Fifteen amateurs in eleven counties of the area took part, with W7TWG in the NCS seat. In the two-day exercise 151 messages were handled by the net, an average of 10.7 messages per hour. This was over half of all the traffic passed during the entire c.d. operation. Only two counties in the area were not represented in the drill—a most creditable performance.

Only one other report from Minnesota—a message from K0MAH indicating that the Brainerd group was "in full swing."

Nevada

The Boulder City AREC conducted a continuous watch on 7112 kc. on May 3, 4 and 5 at the request of state RO W7ZT and succeeded in copying thousands of words of traffic from Carson City, as well as some traffic from Boulder City to Carson City. Four AREC members, three of whom



Civil Defense, the Red Cross and the amateurs work closely together in Muskegon County and have joint responsibility for this nifty communications truck. That's W8KTJ on the ground, handing a message to K8KPS, while EC/RO/W8UCG manipulates the ground plane atop the truck roof.

are also RACES members, did the job. — W7HJ, EC Boulder City, Nev.

New Mexico

Our info comes from *LAB News*, a paper put out for employees of Sandia Base in Albuquerque. You don't think of New Mexico as being cold, but four amateur operators nearly froze on top of Pajarito Peak in the Jemez Mountains. With an inch of ice on the 144-Mc. antenna, they nevertheless succeeded in setting up communication with Grants and Moriarity. Actually, this was on the third day of the test. On the first and second days, 28 members of the Caravan Club of New Mexico and other c.d. personnel maintained communication between the Weather Bureau, state police and c.d. headquarters at Rio Grande Park in Albuquerque.

The Totah Amateur Radio Club put on a c.d. program over a local radio station during the conelrad test.

New York

Monroe County was tied into state nets on 75 phone and 80 c.w., while area and county communications were handled by eleven mobiles on ten meters, four on six meters, the Rochester Warden's Net on 2 meters, Command Net A with four towns and Command Net B with three towns on

six and two meters, all funneling into the Monroe County Control Center. A total of ten nets were in operation with 52 operators. An average of one message per minute was maintained the first night of operation. The exercise was conducted on a 24-hour basis for three days.

Operation Alert in Erie County lasted fifty hours and encompassed 258 operators, some in operation for the full time. Erie County RO (also W. N. Y. SEC) W2LXE says it was a good test and provided many ideas for smoothing out operations.

North Carolina

SCM W4RRH states that on a statewide basis OPAL 60 was successful. C.D. areas used v.h.f. on six or two meters for intra-area communications, while 75 phone or 80 c.w. was used to communicate with state c.d. headquarters from the areas. Crowding of the phone frequency made delays in getting traffic through quite commonplace. However, the state c.d. director was pleased with the result.

Oklahoma

SCM W5DRZ is high in praise of the work done by Oklahoma AREC-RACES groups during OPAL. Despite the fact that tornadoes were leap-frogging all over the state and that real emergencies existed in many places, the amateurs were able to pile up an impressive traffic total for the c.d. test in addition to taking care of needed communications for the tornado emergencies. Over a hundred operators from all parts of the state piled more than 600 messages into state headquarters through the RACES networks, far surpassing the performance that had been expected by the state c.d. director. No area of the state was left without communication on May 4 and 5.

Oregon

In the Portland area, thirteen RACES members were active for the full alert, handling traffic at c.d. headquarters. All are AREC members. The alert was directed by W7GWB, radio officer, and on the roster are two ECs and the Oregon SCM, who sent us this info. Eighty-eight messages were handled.

RACES operators were also active in Marion, Washington and Clackamas County, and in all cases nearly all were also AREC members.

Pennsylvania

AREC-RACES operators in the Blair County area took part in OPAL with four mobile units on ten and two meters on high points surrounding Altoona and a fifth unit at Roaring Spring. Contact was maintained with two-meter portables in the downtown area. Reports on traffic conditions were funnelled from the portables to the mobiles, thence to W3LIV who relayed them to the main control center. Base stations in Tyrone, Hollidaysburg and Roaring Spring also reported to W3LIV. The plan worked out perfectly and the amateurs received high praise. — W3LIV.

EC W3WRE advises that Cambria County has only its regular weekly drill to report, with 25 operators, twenty of whom are AREC members. This is the seventh year without a break in weekly drills, the chain not interrupted for OPAL because there was no statewide activity.

Rhode Island

Amateurs in Newport County turned out in force in an OPAL exercise built around a simulated enemy submarine sending saboteurs ashore. RACES operation was on ten



Serious business at the Erie County, N. Y., control center during OPAL. From front to back are K2HUK (SCM, W.N.Y.), W2CUU, K2VAW (EC Erie County) and W2LXE (SEC, W.N.Y.). The latter is also county RO and the other three are alternate ROs.

QST for

This is the gang that put on such a fine OPAL show in the Altoona (Pa.) area. Top row, l. to r., K3GRU, W3ZVA, K3GHI, W3KQD, K3IML, W3ISZ, W3MRI. Bottom, W3MBB (RO), W3LIV (EC), K3ELL, W3JHG, W3ROA, W3CHN, KN3JPN.



and two meters, including stations in Newport, Portsmouth and Middletown, all operating under W1JFF, RO and EC for Newport. W1LUO and W1BBN, RO-EC for Middletown and Portsmouth respectively, were also active with their groups. The Newport e.d. director was high in his praise of the amateur efforts.

Tennessee

Oak Ridge was active in OPAL, according to info gleaned from the bulletin of the Oak Ridge Radio Operators Club. Contact with state was maintained on low frequencies when the planned six-meter link was unable to do the job. The operation was under the direction of EC K4OUK.

Texas

Harris County EC W5AIR says that our bulletin to ECs on OPAL contained a great deal more information than they got from their e.d. office. The latter said they would not know the assumed situation until the sirens sounded, but even then nothing happened and the amateurs were not called upon. A pity not to make use of an active AREC group such as exists in the Houston area.

Vermont

We have a complete and detailed report from W1VSA, RO for C.D. District #1. Wish we could reproduce it in full, but because it's six pages long this is obviously not possible. Local operation was on two meters, covering two of the three sectors in the district. Contact with state was on 3993 and 3518 kc. Twenty operators took part. Towns represented were Enosburg Falls, Shelburne, Winooski, Essex Jct., Middlebury, E. Middlebury and Vergennes. Liaison with northern New York State was effected via Air Force MARS.

Washington

The State of Washington got off to a good start on May 2 by a e.d. alert of doctors throughout the state. Doctors alerted went to the homes of amateurs and a simulated emergency test was carried out with excellent results. Six amateur stations were known to have been active in this alert. The AREC of Clark County participated by helping to supply extra operators. — W7ZDQ, EC Clark Co.

West Virginia

Our very competent SEC, W8HZA, supplies us with a complete summary of amateur participation through both RACES and AREC. The state net operated a total of 18½ hours, mostly during the first two days. State net control handled 27 messages and alternate control handled 37, using nineteen operators. Contact was made with thirteen strategic locations. Operation was on 80 and 40 c.w., 75 phone and six meters. Contact was maintained with OCDM Region 2 headquarters without difficulty on 7103.5 kc. Special mention is made of the support of the Kanawha County AREC group for their organized manning of the two state control centers.

A separate report from W8FUM says 15 amateurs were participating in the OPAL exercise in Cabell County.

Wisconsin

Brown County had an extensive turnout for OPAL. EC W9HDV directed the amateur activities from a new control center on 2, 10 and 75 meters.

Twenty-one amateurs participated in OPAL in Eau

Claire County, many of them mobiles. Officials were greatly pleased with the result.

The Milwaukee unit of the AREC took part in OPAL under EC W9RUF, who is also RO for the Metropolitan Target Area C.D., covering seven counties. Control center was located at Indian Mound Boy Scout Camp. Other units were installed at Lapham Peak State Park, Milwaukee County/City Control Center and five zone controls in Milwaukee County. Operation was on 2, 6, 75 and 80 meters. The traffic total mounted to 376 sent and 589 received. — K9KJT, Asst. EC, Milwaukee.

Comments

"A continuing growth of RACES in Florida is very evident." — W4UHY. "Some areas need improvement, but the test was a success from a communications standpoint." — W4RKH. "Last year I complained about wasting a day with nothing to do. Can't say that this year." — W7DPD. "We were pleased with the good turnout of operators and many things were learned." — W8STR. "We take our civil defense activities seriously. These alerts are for a definite purpose and the same situation could exist if the alert was issued during an enemy attack." — W8UMS. "Our successful net is due to the large numbers of willing and cooperative amateurs taking part." — W1BB. "A great improvement over OPAL 59 and we're proud of all who participated." — W8JYJ. "If it could be arranged to have a get-together of AREC-RACES and e.d. communications chiefs, a lot of problems could be worked out. Let's not let it slide!" — W8TWG. "Oklahoma amateurs sure came through and there was no mistake about that." — W8DRZ. "K4IUY's XYL decided to present him with a YL harmonic right in the middle of the Alert. We thought she should be named 'Opal,' but no soap." — K4OUK. "Hate to think what would happen if missiles started coming down in Texas; not one person in ten thousand would know what to do." — W5AIR. "Without communications, we have no command." — W1VSA. "Any government employee signed up in e.d. is allowed up to 40 hours per year leave, with pay, to participate in e.d. drills." — W7UVY, per W7ZDQ. "Scheduling of the alert for a three-day mid-week period made it difficult to obtain operators for the daytime shifts." — W8HZA. QST



WHO NEEDS FILTERS OR EXPENSIVE SHIELDING? THIS IS ONE HOME-BREW RIG THAT IS ABSOLUTELY GUARANTEED TO BE TVI-FREE



Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

SLOW-SCAN TV ACTION

Mr. Stephen Smith's letter in August, *QST*, nicely outlined the case for slow-scan TV in the phone bands. An important point to keep in mind is that the slow-scan equipped amateur is a phone man, and in most cases has been one for years. He is a phone man who likes interesting QSOs. At intervals, audio from his slow-scan gear replaces the audio from his voice and at the receiving location, pictures illustrate his comments. His transmitting and receiving equipment is regular phone gear, and the output of his slow-scan equipment is audio — audio requiring less band width than his voice for proper transmission.

With slow-scan permitted on a regular basis in the low-frequency phone bands, most things would remain the same; the same phone men with the same rigs would be spending about the same amount of time in QSO with other phone men. One thing would be different, however; we would be seeing the other fellow's rig, family, and community rather than just hearing about them, and perhaps would do a better job of understanding the other fellow's way of life as well as showing our own.

Some hams do not realize that the first positive step toward getting ARRL action on this or any other matter is a letter to one's ARRL division director asking for action. His address is listed on page 8 of most *QST* issues, and the little time required to write is an investment in the future of our hobby. — *Copthorne Macdonald, WA2BCW, Elmira, New York.*

AMATEURS IN INDUSTRY

From time to time the value of the radio amateur to the armed forces has been mentioned and is cited as one of the justifications for amateur radio. I do not dispute this claim but I do feel that we have not given proper credit for what amateur radio is doing for industry. An article in the June 1960 issue of *Iron & Steel Engineer* illustrates how the training of the radio amateur is being used in modern steel mills.

In this article "Electronic Maintenance Training at Allegheny Ludlum Steel Corp.," the author, Mr. J. C. Haube, states "It is interesting to note the qualifications of the six men chosen (for the position of electronic repairman) . . . four of the six were amateur radio operators."

In the discussion of this article, Mr. R. T. Winterringer of Republic Steel Corp. states, in commenting on selecting men to maintain equipment of an experimental nature, "We were fortunate in our selection of three amateur radio operators. . . . Two of these men, approximately one year ago, completed the FCC examination for the maintenance and adjustment of a high-frequency voice communication system recently installed on our transportation equipment such as locomotives, diesel cranes, overhead cranes and straddle trucks. The recent installation of electronic regulators on our high-speed shear rectifiers and the programming of screwdown control have added to their burdens."

Also of interest in the discussion of this article is the statement of Mr. J. D. O'Roark of Weirton Steel Co. "The number of electronic maintenance personnel (at Weirton Steel Co.) has grown from five in 1943 to 51 in 1959."

I feel sure that I am safe in adding that the radio amateur who is employed in electronic maintenance in industry usually finds his job interesting, challenging and one with a reasonably certain future. — *Walter H. Bolinger, WSUGV, Pittsburgh, Pennsylvania.*

HI-FI TV

I have just cleared up a bad case of TVI which had kept me off the air for over a month. What happened might be of interest to the gang.

One night the XYL called into the shack saying I was

knocking the picture off Channel 2. My daughter also commented I was getting into her new portable stereo record player and the little b.c. radio in the bathroom.

The rig was given a routine check and everything seemed to be okay. The only way the TVI could be eliminated was to lower the grid drive to the final until the output was almost nil. The s.w.r. meter was removed from the coax line to the antenna with no improvement. There was no noticeable difference with the low-pass filter in or out of the line. The intensity was about the same with either the beam or the long wire.

The TV receiver checked out okay. I borrowed a portable TV from W2DRV and set it up in the shack using only its built-in antenna. No adjustment to the rig helped any except to reduce the output to almost zero. The water pipes in the basement were rapped with a hammer and all the exposed BX cable I could reach was bonded together with copper wire. No good. I was getting desperate.

The decision was made. The only thing left to do was to pull out all the light bulbs and line cord plugs in the house and clean the contacts with steel wool or sand paper. The shack was first. Nothing overlooked. The rig was keyed occasionally to check the results. Next was the daughter's bedroom. The metal bases on the light bulbs were all cleaned up and I was sanding the prongs on the line cord plug to the stereo when the "light" dawned: this thing has a crystal in the pickup arm! Without returning the plug to its socket I went back to the shack and closed the key. With power in the antenna the TV picture was clean.

That was it. Plugging in the stereo again brought back the TVI. Reversing the plug altered the intensity somewhat but it was bad either way. A small 45-t.p.m. record player with no amplifier has no TVI effect at all.

It's nice to be back again. I went on a QSO binge to get it partly out of my system — Hi! — *James E. Higgins, W2CWX, Highland Park, New Jersey.*

BURNT FINGERS

Reference your printing of my "protest" (July *QST* Correspondence) on Larson E. Rapp — well, as PT once said, "there's one born every minute."

Sure is rough to attend meetings of the Okinawa Amateur Radio Club these days — *QST* and I have provided them a source of much merriment for months to come!

I'll read the mag more carefully next April! — *Norman W. Pinney, Jr., W4EMP/KR6PN, APO 239, San Francisco, Calif.*

WIAW CODE PRACTICE

In the Navy, I have been stationed aboard the *U.S.S. Elokomin* (AO-55) and have tuned in on WIAW nightly (well, almost) for the past year, during which time we have been in the Mediterranean, the Caribbean, the North Atlantic and other coastal operations. Almost always WIAW could be heard with good strength, even in those remote places. I think I owe a lot of my success as an amateur and as a Naval operator to your nightly code practice sessions. I take my hat off to the League for the work it's doing for ham radio. Keep it up. — *Arthur J. Williams, K9DHX, FPO, New York, N. Y.*

OO CARDS

The other day I received an A.R.R.L. Official Observer's card. It reported me RST 457. All other log entries on this date gave T9 reports.

I then remembered an article in July *QST* by W7ETK. I found the same thing in my log as Mr. King did in his — the constant use of just T9. This signal condition may have

(Continued on page 152)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINIM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, W1WFO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr., Phone

ARRL Activities Calendar.....	86	DXCC Notes.....	92
Brass Pounders League.....	87	RACES News.....	90
CD Parties Results.....	87	Section Emergency Coordinators.....	91
Code Proficiency Program.....	93	Traffic Topix.....	88
DX Century Club Awards.....	93	With the AREC.....	89

October. The new radio season as always holds inviting prospects of exciting DX, worthwhile traffic and fraternal contacts, and full opportunity for you to hold station appointment. May we extend to all amateurs an enthusiastic invitation to *take part* in the new season's operating activities. Output is in proportion to input, so it follows that more taking part will up your results. ARRL organization is designed to make work with others possible and practical. Operating individually gives much less return than by working with others. Speaking of activities, *QST's* monthly advance-listings in the Activities Calendar should be followed to plan for activities ahead of time. Detailed rules and announcement of major contests are usually printed the same month a given activity takes place. But these are merely the cream in the coffee. Making our *daily* operating richly rewarding should be our aim. Go after awards as you will, but beyond the casual collection of pasteboards for WAS or DXCC, take some time to belong and participate in your section net, club, and AREC/RACES emergency group. Just a *few minutes* of the day puts you in touch with ten or twenty amateur stations when you're a member of a net. The latching string is always out to anyone who calls in with traffic.

Simulated Emergency Test, October 8-9. In this test each Emergency Coordinator is asked to sponsor a *local* test based on simulated emergency. This is a chance to check out or develop stand-by amateur radio emergency plans and capability. It is also an opportunity to re-register individual amateur willingness to assist in emergencies, to join the AREC and, as part of the

SET, to summarize in a radio message the action that was taken. The SET is not a substitute for additional AREC group get-togethers, such as community projects W8AEU recommended in his article last month. However, as the SET wheels are put into motion at about the same time throughout the country, it therefore becomes a nationally summarized exercise for which all Amateur Radio can take credit.

The Emergency Challenge and You. Whether your main interest is v.h.f., traffic, DX, experimenting or just plain rag chewing, *you and all other amateurs are needed* in the AREC and in such tests as the Simulated Emergency Test. Regardless of whether you are a Novice, a real old timer, new General or Conditional, or a Technician, and regardless of what band you specialize on, there's room for you in the emergency program to make our communications potential for community and nation a lot greater than it is. If you have a mobile or emergency-power on your own (not required), so much the better. But all, if well organized, can count. What amateur operators demonstrate they *can* do in communications determines, to a considerable degree, the standing of our whole hobby and institution of amateur radio. Don't be left out.

Those AREC members that do have mobiles or portable emergency-powered units are eligible for the Official Mobile Unit identification cards, and the EMERGENCY RADIO UNIT placard, available commonly through ECs. See the full SET announcement on page 49 in this issue; get

A familiar call on 75 meters is W1EOR, SEC and state radio officer (RACES) for Connecticut. From the master control box (center), John can make his equipment do everything but sweep the floor.



October 1960

data on local plans from your local ARRL officials, EC, SEC, or SCM. The first step is to get signed up in the Amateur Radio Emergency Corps, if not already registered with your EC or the Section Emergency Coordinator. Help demonstrate Amateur Radio's ability to function as an organized group in every communication need.

Traffic. For the last couple of years, traffic has been on an up-trend. The number of K and WA calls in the reports show the popularity of traffic nets with the more recently licensed amateurs. Our BPL listings last year showed a substantial increase over the previous year. Only 39 BPL medallions were issued back in 1956 but the number was 74 and 69 for 1958 and 1959. You will note that 516 net names are shown in the present Net Directory listings. If we consider nets that report separate sessions on different bands for a different listing, we come out with 560 separate nets. Only nets dedicated to a public service purpose are now listed in the ARRL Net Directory; registrations are currently being made for the new directory to be available around the end of the year. The progress made by NTS, the National Traffic System, should be mentioned. In simple terms this is the ARRL-organized means interconnecting the 73 ARRL sections year-round. There are still vacancies for some Transcontinental Corps positions. If you have the interest and skill, get information from your TCC director. We hope to fill some vacancies before the holiday season traffic peak.

FCC Suspends Technician for 14 Mc. Work; Suspension for Unlicensed and Obscene Operation. Current FCC monitoring actions support the basic requirements for compliance with the Communications Act, and likewise, by penalties, require all licensees to observe carefully the assigned band segments for operations strictly in compliance with the terms of one's class of license.

FCC took under consideration the suspension of the Technician Class Amateur Radio Operator License of Walter J. Burt (WA2CRE/KL7) Seattle, Wash., it appearing that on various occasions, Nov. 1959 to Jan. 31, 1960 and particularly on Jan. 16, 20, 23 and 24, 1960, licensee operated WA2CRE/KL7 in the 14 Mc. amateur band, A1 emission, contrary to the terms of his license and in violation of Sec. 12.23 (d) and 12.28 of FCC rules; and it further appearing that said licensee at various times and on the dates set forth transmitted call letters not assigned by proper authority to his said radio station, a violation of Sec. 12.158 of FCC rules. FCC ORDERED (Mar. 17, 1960) that the Technician Class Operator License of Walter J. Burt BE SUSPENDED for three months. This action became effective May 5, 1960.

FCC took under consideration the suspension of the General Class Amateur Radio Operator License of Dean Ross Hovey (K6KUT) Sun Valley, Calif., it appearing that on or about Jan. 9, 1960, licensee used and operated a radio transmitter without a license, a violation of Sec. 301 of the Communications Act; it also appearing further that said licensee transmitted communications containing obscene, indecent or profane words, language or meaning, a violation of Sec. 12.157 and transmitted unidentified radio communications or signals, a violation of Sec. 12.159 of FCC rules. The Federal Communications Commission ORDERED (April 1, 1960) that the General Class Operator License of Dean Hovey, Sun Valley, Calif., BE SUSPENDED for the remainder of the license term. This action was effective from Apr. 30, 1960.

Give Full Identification to Avoid FCC Citation. Sec. 12.82 of FCC's regulations states the requirements for identification. Transmit the call sign of the station you are working (or net identification), "DE" or "this is" or "from," followed by the authorized call sign of the station transmitting. The placement and time of such full identification is carefully spelled out in the regulations. More FCC citations appear to be being issued because of (1) dropping out parts of the call, (2) leaving out prefix letters and numerals, and (3) not fully identifying at prescribed times. ARRL Official Observer, W9GFF, suggests that we mention this to encourage more careful reading and observance of Sec. 12.82. During recent months he has noticed an increased tendency of many W/K stations to drop out the prescribed intermediate, or the call of the station being called or other parts.

Increase in the Use of Sideband. For amateurs interested in voice work, let us include another annual report item covering the use of s.s.b. Returns from 100 affiliated clubs chosen at random and representing 3196 amateur licensees indicated 342 amateurs active on s.s.b., and 131 additional club members planning s.s.b. operation. This represents 10.7 s.s.b. users per 100 amateurs surveyed through clubs. The figure is comparable to the 6.36 per 100 worked out just 12 months ago. In 1957, we found that 73% of the clubs surveyed had some members with s.s.b. stations. The current survey indicated 81% of these clubs with such members. Of the 3196 amateurs covered by the report, 67.57 operated phone (a.m., s.s.b., n.b.f.m., etc.). — F. E. H.

ARRL ACTIVITIES CALENDAR

Oct. 5: CP Qualifying Run — W6OWP

Oct. 8-9: Simulated Emergency Test

Oct. 15-16: CD Party (c.w.)

Oct. 20: CP Qualifying Run — W1AW

Oct. 22-23: CD Party (phone)

Nov. 3: CP Qualifying Run — W6OWP

Nov. 12-13, 19-20: Sweepstakes Contest

Nov. 18: CP Qualifying Run — W1AW

Dec. 7: CP Qualifying Run — W6OWP

Dec. 19: CP Qualifying Run — W1AW

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of QST issue in which more details appear.

Oct. 1-2: Utah QSO Party, Utah Amateur Radio Club (p. 138, this issue).

Oct. 1-2: VK/ZL DX Contest (phone), NZART (p. 75, last month).

Oct. 8-9: VK/ZL DX Contest (c.w.).

Nov. 5-6: RTTY Sweepstakes, RTTY Society of Southern California (p. 66, this issue).

Dec. 3-4: 21/28 Mc. Telephony Contest, RSGB.

BRIEF

Correct KN8PFY's Novice Roundup score as reported in August QST to 7920, thereby placing him third in Michigan.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for July traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	369	2352	1844	361	4926
W5YDK	1732	41	29	12	1814
W0BDR	90	868	742	1	1701
W0LGG	683	410	387	24	1504
W0LCX	28	728	616	112	1484
W4PL	11	656	582	43	1292
K0ONK	110	520	498	24	1152
W9IDA	31	563	548	2	1144
K1CIF	406	387	296	22	1111
K2THC	0	542	541	1	1084
K6BPI	47	515	403	92	1057
K4AKE	22	505	491	14	1032
W0TUS	40	408	469	87	1004
W0SCA	38	445	443	0	926
K6MCA	76	415	391	10	892
W2CCO	32	410	360	39	841
W6RSY	19	440	259	97	815
W7BA	4	400	374	26	804
W4CDD	107	326	294	32	759
W2EZB	12	359	316	39	726
W1SMU	10	366	342	6	724
W6WPF	15	349	338	11	713
W6GYH	173	269	252	9	703
W0WAL	41	325	286	39	691
K4SJH	274	187	163	33	657
W0TT	26	305	134	152	617
W9DYG	16	318	260	16	610
W3VR	74	282	247	11	594
K2UCY	12	270	272	10	564
W7DEX	4	279	265	14	562
W1NJL	51	235	183	34	503
Late Report:					
W0OHJ (June)...	2	262	251	11	526

More-Than-One-Operator Stations

W4ZJB	320	398	367	35	1120
K6WAH	37	364	246	118	765

BPL for 100 or more originations-plus-deliveries

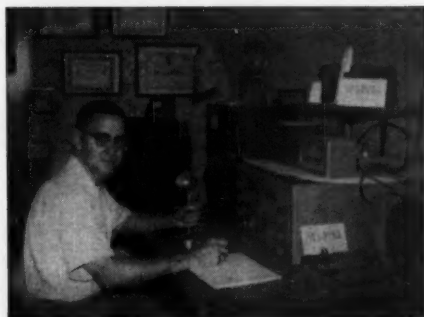
W2CCF	269	KP4PI/1	119	K5TAJ	103
K0UKN/0	173	W1TXL	117	WV2KWZ	102
K7BKH	170	W4EE0	113	K4FNE	102
W2CJR	153	W4ZMH	109	K5CAT	102
W9DGA	153	K2DEL	108	K0VBV	101
W2EW	152	K0UTX	106	Late Reports:	
W3JWN/4	126	K1MJN	105	K8BQD (June)	263
W9CJS	126	W2RED	105	W4EE0 (June)	111
K4CNY	125	K0ORK	105	K4DWU (June)	108
W3TN	122	W8DAE	104		

More-Than-One-Operator Stations

W9LJT/9 118

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W2EZB, K2THC, K4HJK, W0TUS.

The BPL is open to all amateurs in the United States, Canada, Cuba and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours or receipt, in standard ARRL form.



Illinois' W9PNE has been making noise in both the phone and c.w. CD Parties, posting 163-K last January, and again placing on the phone high claimed list for the July Phone Party. Versatility is a valuable asset in the hip pocket of ham radio enjoyment.



In the July CD Party, W2REH listened to 19½ hours of static interspersed with 166 contacts in 37 sections to grab the top of the phone totem pole. Operating 160 through 10 meters netted 31,080 points for Joe, a 16-year-old high school senior.

RESULTS, JULY CD PARTIES

Conditions for both the c.w. and phone Parties bordered on horrid. High noise levels, lightning storms, complete blackouts, ineffectiveness of the high bands, etc., proved a great challenge for the CD gang to surmount. W3GYP summed it up cutely with this comment: "The weather was quite hot; the bands, alas, were not." But K.O. the Party, conditions did not do.

W4DQS seems to be making a monopoly of the c.w. Party, again posting the top score with 199,950, just a hair under the 200K mark. Three in a row would be quite a feat — oh, gang. . . . Well, we got the October Party ahead to unseat East Florida's grand scorer. K5ZB8 (ex-W6WNI) continues to register top scores from Oklahoma. Earl fitting into the second national slot with 172,500. And W2OIB moved way up to third with 157,470.

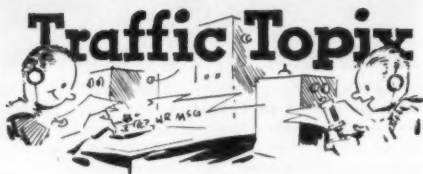
The W2s and W3s definitely have taken the lead away from W1-land on phone. The top five scorers were W2s and W3s, with only four W1s making it into the high claimed scores; whereas, one-land used to dominate the high scores list. W2REH came through this time with 31,080 points, beating our fellow NNJer W2OIB with 22,225 and W3NF with 22,110. It is interesting to note that the top three phone scorers also placed on the c.w. list.

The following are the high claimed scores. Figures show score claimed, number of QSOs, and number of different sections worked. Final and complete standing will appear in the October CD Bulletin.

— W1DGL

C.W.		K5BSZ	
W4DQS	199,950-638-62	K1JDN	108,300-375-57
K5ZB8	172,500-568-60	W2OIB	107,590-406-53
W2OIB	157,470-543-58	W42BX	105,300-400-52
K2IMK/2	155,150-530-58	K4RAD	104,780-398-52
K4PUZ	155,400-516-59	K4RIN	104,778-378-55
K4BAI	152,320-537-56	W4MLE	103,125-371-55
W2REH	149,869-506-59	W3GYP	102,025-366-55
K0BOF	147,200-457-64	K4EJL	101,925-379-53
W8IBX	143,925-500-57	W8AEB	100,595-336-59
K5QNF	141,305-472-59	PHONE	
K0CQC	140,125-470-59	W2REH	31,080-166-37
K0PIE	138,500-455-60	W3NF	22,225-127-35
K4UBR	129,505-432-59	W3MFW	22,110-127-35
K8MTI	127,965-444-57	K2THC	20,790-120-30
K6DDO	127,440-429-59	K2THC	16,120-119-26
W3EIS	125,720-443-56	K2VTX/VE2	10,665-75-27
K8HGT	125,080-420-59	W1NJL	10,450-89-22
W9LNQ	118,530-434-54	KP4PI/1	9,045-67-27
K8KCO	117,425-420-55	K2TJL	8,140-71-22
K4SSB	114,505-390-58	W10KJ	7,480-63-22
W1MTX/3	114,215-426-54	K4PUZ	5,880-48-23
W8TZO	113,430-391-57	K0RFW	5,700-32-20
K5ABV	111,805-378-59	K1BBK	5,670-49-21
W3NF	109,295-422-51	W9PNE	5,400-47-20

At a recent meeting in Michigan, these three important officials got together for a rare photo, for which we thank W8ELR. Left to right are: W8YAN, SEC Michigan; M9UPB, ARRL Great Lakes Division Director and formerly SEC Ohio; and old-timer W8FX, SCM Michigan.



Well, how's everybody in the traffic game these days? Seems like October has rolled around again, and here we are on the threshold of another busy traffic season. The younger fellows who have kept things going during the summer while many of the old timers were on vacation will be going back to school. The veterans of many traffic seasons will be getting back into the swing of things.

Time was, doesn't seem so long ago, that all traffic handling came to a halt for the summer, from May through September. Only a few hardy souls tried to keep going. Not any more. Most traffic nets are year-around propositions. Oh, we still take vacations; more than ever, in all probability, although we have no statistics. The difference is that since those days we have approached traffic handling from a different angle. Then it was schedules, usually one a night with at least four or five different amateurs, but the same ones each night. Or it was Trunk Lines, in which one had to be an ORS and on deck every night — or else! Now it is nets, most of which require your attendance only one or two nights a week, and even then you may have an alternate. It is easier to be an active traffic man than it was 25 years ago, because today "active" means on the air regularly, while 25 years ago it meant on the air every night, except Saturday and Sunday and during the summer.

But leave us not reminisce. It dates us, and there is no particular merit to growing old. Traffic handling among amateurs is bigger and better today than it ever was, and we think that the coming season is going to be the best yet. We criticize and complain about bad procedure and undue delays and following organizational patterns, but the purpose of this is to make the good better rather than to make the bad good. When we get to thinking we are perfect we become complacent, and this is a bar to further progress — in fact, it's an invitation to decadence. We'll continue to lay it on as long as you'll continue your endeavors to make amateur traffic handling a public service to be proud of.

July net reports.

Net	Sessions	Check-ins	Traffic
Eastern Area Slow	28	123	65
20 Meter SSB	19	545	1986
Hudson Traffic	31	367	277
Trancontinental Phone	31	...	1940

National Traffic System. Ever since NTS was organized we have had difficulty reconciling our policy of using "the best mode to suit the need" with some of the NTS participants or would-be participants who use only one mode of emission for their traffic work. As a matter of fact, NTS development and organization has been difficult from the

start, mostly because it contemplated the ideal and strove to achieve it instead of the easier way of contemplating the existing situation and trying to make an organization out of it. We know as well as you that practicalities have to be considered, and if you will look back a little you will also see that NTS has had to make a number of concessions to circumstances in order to attract enough traffic men to make it succeed. But making temporary concessions doesn't mean abandonment of ideals. We still dream of a thoroughly integrated nationwide traffic system using all modes of emission suitable to the purpose with everybody working together to a twofold purpose: (1) Handle traffic systematically and with greatest efficiency from its point of origin to its point of destination, and (2) provide the maximum in traffic training for the maximum number of operators.

Now we want to make a couple of things crystal clear in regard to NTS: First, that we are definitely not prejudiced against any single mode of operation, as has been alleged by many of those who operate only one mode. Neither are we prejudiced in favor of any, as they are. Second, that there is at present no intention (and never has been) of establishing separate national traffic systems for the various different modes of operation. There are ways of working together if we really want to. If we look facts squarely in the face and without prejudice, it stands to reason that the best traffic man is the one who has the most operating efficiency and the greatest versatility, and we want the best traffic men for our liaison work in NTS. If we are to have proper liaison between NTS nets working by various different modes, we must have versatility as well as efficiency on the part of our traffic men. And insofar as practicable, we will select the mode to suit the need — or to put it differently, use the mode best suited to the purpose involved. Can't we stop the phone-c.w. squabbling and get down to business?

Net	Sessions	Traffic	Representation		
			Rate	Average (%)	
EAN.....	31	1189	.744	38.3	94.1
CAN.....	31	912	.513	29.4	98.9
PAN.....	30	1048	.593	34.9	100.0
1RN.....	31	467	.435	15.0	84.3 ¹
3RN.....	61	592	.341	9.7	94.0
4RN.....	62	593	.243	9.5	88.5
RN5.....	52	808	.457	15.5	92.5
RN6.....	62	1004	.312	16.2	87.4
RN7.....	60	415	.228	6.9	30.8
8RN.....	60	228	.153	3.8	73.9
9RN.....	47	626	.417	13.3	78.7
TEN.....	75	822	.412	10.9	55.2
ECN.....	18	112	.293	3.4	68.5 ¹
TWN.....	30	267	.333	8.9	60.7 ¹
Sections ²	822	4873		5.9	
TCC Eastern.....	99 ³	581			
TCC Central.....	93 ³	952			
TCC Pacific.....	124 ³	876			

Summary.....	1472	16365	EAN	9.4	PAN
Record.....	1710	20350	.795	15.2	100.0

Late Report:

8RN (June)...	51	234	.156	4.6	79.1
---------------	----	-----	------	-----	------

¹ Region net representation based on one session per night. Others are based on two or more sessions per night.

² Section nets reporting: AENB, AENP Morn, AENP Eve, AENT (Ala.); QFN, FPTN, Gator, TPTN (Fla.); MSN, MJN, MSPN, MSPN Noon (Minn.); Iowa 75; Tenn. CW; CPN & CN (Conn.); VFN (Va.); S. Dak 40, S. Dak 75, SDN (S. Dak.); WVN (W. Va.); TLCN (Iowa); ILN (Ill.); NHN (N. H.); NEB (Nebr.); SCN (Calif.); CCW (Colo.); WIN, WSSN (Wis.); SCN (S. C.); MDDS (Md.-Del.-D. C.); BUN (Utah).

³ TCC functions reported, not counted as net sessions.

At first glance, it would seem that we finally failed to beat previous session and traffic records; but this column was prepared slightly earlier than usual, and the records shown were those adjusted for late reports last July. So although *maybe* we fell short of last July's records, this won't be sure until after all July reports have been received—and we think there are still quite a few to come.

Around the Regions. W9DYG now puts out an occasional CAN Bulletin called "CAN KAN"; CAN certificates have been issued to W0KBD and K4AKP. The 3RN reporting looks good mainly because of the efforts of two or three stalwarts in each section, but E. Pa., formerly a weaker link, is growing in stature through the efforts of RM W3AXA. W5TFB/5 took over RN5 during August and September while Doc's (W5GY) rig was temporarily *kaput*. RN6 certi-

cate has been awarded to WA6NCE (formerly K7CWV); summer conditions continue to make things rough on RN6. W8DAE, a really old time traffic man, has taken the reins of 8RN from W8DSX, who went to California; he hopes to get things really rolling this fall, but he needs a lot of help from you Eighth District traffickers. W9ZYK says that the figures in the 9RN report represent hard work under most difficult conditions. The early session (1700) of TEN is still being tested. VE3BZB replaces VE3AAU as manager of ECN. K0EDH says that TWN representation is just about as lousy as might be expected for this time of year, but is encouraged by increasing activity in Arizona.

Transcontinental Corps. Everything going along about as usual, with the boys successfully battling the unfavorable conditions most of the time. We still note a few vacancies in the TCC-Eastern chart, which may be gone by the time you get this. Better hurry if you want to get in on one of them (see W1SMU).

July Reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern.....	99	87.9	1103	581
Central.....	93	87.1	2036	952
Pacific.....	124	96.0	1732	876
Summary....	316	90.8	4871	2409

The TCC roster: Eastern Area (W1SMU, Dir.) — W1s WEF AW NJM OBR SMU, W2s OPB ZVW FEB, K2s THC SIL SSX, W4s APY COO, W3WG, VE2AZI/W1, K9GDF. Central Area (W8BDR, Dir.) — W4ZDB, W9s DYG CXY DO ZYK, W0s LCX SCA BDR. Pacific Area (W6EOT, Dir.) — W4DNU/6, W5ZHN, K0s TPL GID LVR, W0s EOT ELQ HC YHM WFF QMO, W4s ATB NCE, W7s ZB DEX GMC, K0s EDH EDK DTK CLS/6, W0s ANA WME KQD.

NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; phone — 3765, 14,160, 28,250 kc.



The announcement of the annual Simulated Emergency Test appears elsewhere in this issue, but for the benefit of the regular readers of this column (both of 'em), we want to point out something different about it this year that traffic from individual AREC participants will go to their SECs, rather than to ARRL headquarters. ECs will dispatch messages (brief radio reports) to headquarters, as usual, and in addition they will send a radio report to their SECs — or, if no SEC, to their SCMs.

The reason for this change is that in recent years some of the traffic nets have been complaining about overload as a result of the SET. Not that they wouldn't be overloaded in a real emergency, but this kind of an overload is unjustified and unrealistic. So we'll try a little different approach this year. Participating AREC members will originate messages, as usual, but this time addressed to the SEC instead of the NEC, to reduce overload on national nets. The SET dates: October 8 and 9. See your EC, get in the swim.

A genuine emergency interrupted the Kanawha County (W. Va.) AREC transmitter hunt on June 18. K8NYE/mobile broke into the net to report a severe auto accident near Institute, W. Va., in which a car loaded with passengers had rolled down a steep embankment with several people injured. Net Control K8CSG directed W8HYX to summon state police and medical assistance, and this was quickly and efficiently accomplished. More lives saved by amateur radio. — K8CSG.

On July 23 the sheriff's office of Cascade County, Mont., requested the assistance of the Great Falls AREC in establishing communications in connection with a forest and range fire ten miles south of Cascade. The AREC was activated, but withdrawn as fire-fighting was held up until daybreak. However, at 0400 the following day K7CYT

came on the air to check in mobiles starting for the fire location. At 0630 W7DSS took over as control station. At the scene of the fire, mobiles were placed at strategic locations on the fire's perimeter, with one at fire headquarters to act as control. These units relayed messages and information for the fire fighters and for the county sheriff's office, as well as maintaining contact with Great Falls. The frequency used was 3910 kc. Communication held up well until evening, when QSB and QRM became difficult. Cooperation from interfering stations contacted was excellent, but some could not be reached and undoubtedly did not realize they were interfering. W7DSS was relieved as NCS at 1725 by W7KUH (SEC), who closed his station at 2345; although the emergency was considered secured at 2245, a control station was kept on the air until all mobiles had returned. Everybody was well pleased with the work of the AREC in this emergency, reported by K7CYT, EC for the Great Falls area. Other participating amateurs: K7s DES JXL/mobile IOA/mobile. W7s AU/mobile BOV/mobile FGZ/mobile CRD/mobile TLA/mobile BOZ JZW HFZ, K0JTY, W0MKN.

On July 25 the Mobile Amateur Communications System of Seattle was alerted at 2230 for a search and rescue mission near Bumping Lake in Yakima County, Wash. Three two-meter mobiles, a portable station and a hand-carried unit were dispatched. W7TWU packed twenty pounds of hand-carried unit into the search area for communication with W7GZS/mobile and K7GUH at the temporary center in the ghost town of Copper City. K7CXZ and K7CYB operated W7GZS/mobile and K7HNU set up a 40-meter station at Copper City. Through their combined efforts, the Yakima County sheriff could keep in touch with his office and with the searchers. The object of the search, a 13-year-old boy, was found early on July 27 in good condition after four nights in the brush. W7s KBH BJR and PHG assisted by handling traffic to and from Yakima and Seattle. — K7GUH.

On April 16 a tornado warning was issued for the Cleveland (Ohio) area at 1730 and remained in effect until 2230. The first storms began to appear within an hour of the first alert, so there was very little time for the weather net to organize, but they were in the job when the first storms hit. Although thunder storm activity was terrific, fortunately

no real communications emergency developed. However, several times the Weather Bureau requested information on particular storm cells over definite areas that appeared on radar, and the information was forthcoming from the AREC Weather Net within minutes. A total of 93 stations reported into the net. — **W8AEU**.

On April 30 a sudden cold front and squall line crossing Southern Michigan precipitated tornado rumors throughout the area. At the first warning, Calhoun County EC K8CIS at Battle Creek activated the Southern Michigan Net on 50.7 Mc. and put it at the disposal of the local weather bureau. Stations located in alleged strike areas were used to check out the many rumors being broadcast by radio and TV stations, all of which were discounted. Kalamazoo EC W8PDP activated the net in his area in running down the rumors. Four mobiles were used and ten other stations took part in this activity. After the storm, the weather bureau announced that their only reliable source of information was the AREC nets. No communications emergency developed. — **W8YAN, SEC Michigan**.

In early April, need for a rare instrument to save a dying child in Havana, Cuba, brought amateurs into action to locate the instrument and have it airlifted. In addition to Cuban and South American amateurs, many amateurs in this country assisted in locating the instrument and seeing that it was in the hands of the proper people in Havana. Thanks to K4ICA for reporting this incident.

On June 26, W0TUS, Minnesota SEC, received a call from a woman in Bemidji asking for assistance in locating their daughter and son-in-law en route from Miami. It seems that there was a death in the family. W0TUS immediately went to work on the problem, and by 1230 the next day had amateurs in seven states on the alert to contact state police in an attempt to find the couple. — **W0TUS**.

Because we have to get our copy in early this month (so we can take a vacation), this cleans up all reports of emergencies, alerts and semi-emergencies in our files. We still have dozens of reports of other AREC activities that have never been reported. Although it just isn't possible to give a complete rundown on each (they date all the way back to around the first of the year), suppose we at least list them chronologically, so they will have been mentioned. Those which have to be hacked off the end of this list will be run later, in as much detail as space permits.

January 17: The Broome County, N. Y., AREC net sponsored a 6-meter transmitter hunt with excellent participation and some unique twists. — **K2RFC**.

January 19: Members of the Broome County (N. Y.) AREC took part in a TV discussion program on amateur radio, with WA2BTD and W2EDL the principal victims. — **K2RFC**.

February 7: Turlock (Calif.) Amateur Radio Club members provided progress reports on Olympic torch bearers for the 1960 Olympic Games at Squaw Valley, Calif. — **K1LVW**.

February 14: Portland (Me.) amateurs put on a local TV program designed to acquaint viewers with a cross-section of amateur radio. — **K1LSJ**.

February 21: Chenango County (N. Y.) mobile enthusiasts provided communications for a sports car rally in the snow. — **K2RFC**.

February 24: The Red Cross of St. Clair County, Mich., conducted a simulated emergency test in which the county AREC played an important part. — **W3QFQ**.

February 28: "Operation Sesame," a large-scale operation spark-plugged by WA2CGD of the Schenectady (N. Y.) AREC, was sponsored partially by the Schenectady County Chapter of the American Red Cross. This was all written up for QST, but unfortunately never hit print. — **K2HNW**.

March 26: A practice exercise of the Red Cross of Portland, Ore., with the AREC net on 3875 kc., included the section PAM, the SEC and six ECs. — **W7JDX**.

March 27: Three Washington ECs pooled their organizational resources to furnish communications for the Washington Mountain Rescue group in an exercise participated in by the governor and other state dignitaries — plus 29 amateurs. — **W7HMQ**.

April 17: K3DPH reports a "dandy" SET in southern Louisiana — a tidal wave problem. It was pulled completely by surprise on the net members.

April 29: A simulated disaster drill of the Red Cross of Jefferson County, Ala., in which eight county AREC amateurs took part. — **K4AOZ**.

May 8: Members of the Great Falls Radio Club, Electric City Radio Club, and Great Falls AREC took part in the annual Jaycee Trout Derby, 40 miles south of Great Falls, Mont. — **W7KUH**.

May 13, 14, 15: Lane County (Ore.) AREC members provided communications for the Boy Scout Camporee near Eugene. About 600 boys and 75 adults were served in this operation. — **K7CJB**.

May 16: The Cuyahoga County (Ohio) AREC sponsored a talk and demonstration to the East Cleveland Kiwanis Club. W8AEU did the talking, K8DBF assisted in the demonstration. — **W8AEC**.

May 30: Amateurs of Grants Pass, Ore., assisted local newspapers and radio stations in obtaining election returns. The local club was assisted by RACES members using c.d. equipment. — **W7JDX**.

May 22: Members of the Kalamazoo County (Mich.) AREC participated in a mock disaster exercise. About 45 amateurs provided communications on 75, 6 and 2 meters. — **W8ELW**.

May 23: Both the Queens County (N. Y.) Net and the Milwaukee (Wis.) Emergency Net found themselves on the same frequency (29.5 Mc.) starting net roll call with skip just right between them. Confusion for a while, then they got together and had a ball. — **W4IZV**.

May 30: The Southern Oregon Radio Club of Grants Pass furnished communications for the second Memorial Day "Boatnik" on the Rogue River, near Galice. — **W7JDX**.

June 5: Amateurs provided communications for the Third Annual Canoe Race on the Raisin River from Deerfield through Petersburg and on to Dundee, Mich. Six mobiles took part. — **K8ENY**.

June 14: AREC mobiles took part as usual in the Cleveland (Ohio) Flag Day parade, and did the usual fine job. K8MBW was in charge and thirteen amateurs were in on the act. — **W8AEC**.

July 2: K9DFK, EC for Clinton County, Ind., reports that his AREC group provided communications for the centennial of Sheridan, Ind., on this date. Some nine amateurs were involved. — **W9SNQ**.

July 4: The Tampa AREC had a drill in conjunction with the U. S. Coast Guard to determine the amateurs' value in Coast Guard rescue operations. — **K4EBT**.

July 17: A simulated hurricane alert was conducted in the Norfolk area by Acting EC W4QDY (also SCM) and his AREC crew. It lasted for two hours and was very successful.

Thirty-two SEC reports were received for June activities, on behalf of 11,819 AREC members. This makes our June 1959 records look pretty sick (23 and 9022). Louisiana's SEC reported to make one additional to our list for 1960, now totalling 39. Other sections whose SECs reported: Mont., Ill., E. Fla., Okla., S.C.V., Ore., E. Pa., E. Mass., NYC-LI, Minn., Mich., Colo., Ohio, S. Texas, S.J.V., Wis., Nevada, Utah, Wyo., Vt., S. Dak., Ala., N. Mex., Ga., Ont., Me., E. Bay, N. Texas, Wash., Ind., Kans.

We are considerably ahead of our half-way point of last year in the matter of SEC reporting. Let's keep going, and you ECs: give your SECs something to report! The following sections have 100% reporting records for the first six months of 1960: S.C.V., NYC-LI, Ore., Ga., Ala., N. Texas, S.J.V., E. Fla., S. Texas, E. Mass., E. Bay, S. Dak., E. Pa., Wyo., Nev., Me., Wash., Ind., N. Mex., Okla., Utah, Minn. That's a mighty long list of 100%ers!

RACES News

On June 11 at 2000 the members of the Wood County (Ohio) Amateur Radio Club set their RACES program in action when a tornado alert was posted for Northwestern Ohio. Radio Officer W8PSK and EC W8VTL had all members notified within 15 minutes and activated the base station, K8TIH. Two mobiles were dispatched and two fixed stations were alerted on 50.37 Mc. As no tornadoes were sighted, the net was secured at 2200, four additional amateurs having participated in what turned out, fortunately, to be just another RACES drill.



Section Emergency Coordinators of the Amateur Radio Emergency Corps

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does *your* town have an ECT? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION			
Eastern Pennsylvania	W3DUI	Emmet W. Kuehner	242 E. Broad St.
Maryland-Delaware-D. C.	W3PKC	John J. Campodonico	629 McCabe Ave.
Southern New Jersey	W2YRW	John Wesley Sammis	300 S. Woodstock Dr.
Western New York	W2LXE	John S. Tylic	193 Avon Rd.
Western Pennsylvania	W3OMA	Walter P. Remele	20 N. Howard Ave.
CENTRAL DIVISION			
Illinois	W9PSP	Jack Stanton	2623 E. 74th St.
Indiana	W9SNQ	Leonard M. Chalk	815 West Arch St.
Wisconsin	W9YQH	Chet T. Horton	939 Oregon St., Box 179
DAKOTA DIVISION			
North Dakota	K9KBV	Robert H. Dexter	514 First Ave., E.
South Dakota	W9SCT	Lester R. Lauritsen	Rt. 3, Box 32
Minnesota	W9TUS	Robert R. Power	Bob's Radio TV, Box 2
DELTA DIVISION			
Arkansas	K5CIR	Odia L. Musgrove	1321 W. Baraque Ave.
Louisiana	W5MXQ	A. I. Powell	224 Hollywood Drive
Mississippi	K5QNF	Ed Russell	1322 Chambers St.
Tennessee	K4EJN	Judson H. Scott	201 Logan St.
GREAT LAKES DIVISION			
Kentucky	W4BAZ	J. B. Wathen, III	391 Mockingbird Valley Rd.
Michigan	W8VAN	Donald E. Blasfield	RFD 3, Box 704
Ohio	W8HNP	Arlington A. Garn	2979 Pemberton Dr., Apt. 2
HUDSON DIVISION			
Eastern New York	W2KGC	William L. Stahl	Shirley Ave.
N. Y. C. & Long Island	W2ADO	Madrice Mulligan	Box 134
Northern New Jersey	W2APY	Daniel Earley	216 Grove Ave.
MIDWEST DIVISION			
Iowa	K9EXN	Ronald M. Schweppe	1412 Kellogg Ave.
Kansas	W0VZM	Patty L. Goyette	Box 83
Missouri	K8LTP	Henry Miller	2053 Eureka
Nebraska	W6JDT	Francis B. Johnson	820 S. 44th St.
NEW ENGLAND DIVISION			
Connecticut	W1EOR	John L. Henley	RFD 1
Maine	W1JMN	Jeffrey I. Weinstein	79 Caleb St.
Eastern Massachusetts	W1AOG	Donald J. Gupitli	17 Park St., Court
Western Massachusetts	W1BYH	Norman Rivers	18 Saad Plwy.
New Hampshire	K1GQK	Howard Hook	RFD 1
Rhode Island	W1PAZ	Thomas C. McCormick	1934 Smith St.
Vermont	W1EIB	Harriet Proctor	
NORTHWESTERN DIVISION			
Alaska	K1LBE8	Herbert R. Treslender	1710 Snowcap Drive
Idaho	W7IWU	Alan K. Ross	2105 Irene St.
Montana	W7UQI	Emmett F. Roberts	Box 771
Oregon	W7HMQ	Everett E. Young	2217-5th St., S.E.
Washington			
PACIFIC DIVISION			
Hawaii			
Nevada	W7JUC	Ray T. Warner	539 Birch St.
Santa Clara Valley	W6ZRJ	Jean A. Gmelin	1089 Huntington Drive
East Bay	K6DQM	Alex Eastman	210 Castle Hill Ranch Road
San Francisco	K6IKV	Antone F. Busdas	4308 — 38th Ave.
Sacramento Valley	W6EBL	F. E. Robinson	Sonora Motor Hotel
San Joaquin Valley			
ROANOKE DIVISION			
North Carolina	W4RRH	B. Riley Fowler	Box 145
South Carolina	K4PJE	Woody Brooks	Box 455
Virginia	K4MJZ	William B. Zammit	1323 Kaiser Place
West Virginia	W8HZA	John A. Davies	659 Forest Circle
ROCKY MOUNTAIN DIVISION			
Colorado	W9NIT	Donald Middleton	920 West Adams
Utah	W5CIN	Leonard M. Norman	903 North Butler Ave.
New Mexico	W7CQL	Wayne M. Moore	2000 E. 1st
Wyoming			
SOUTHEASTERN DIVISION			
Alabama	K4JDA	Leighton W. Steele, III	212 Murphy Drive
Eastern Florida	W4IYT	Andrew C. Clark	41 Lenape Drive
Western Florida	W4HKK	Clark A. Simms, Jr.	3365 Newton Drive
Georgia	W4PMJ	Harold M. Rosner	P.O. Box 146
West Indies (Cuba-P.R.-V.I.)	K4AAA	Ernesto Viera	170 Ariamendi St.
Canal Zone	KZ5RM	Roger M. Howe	Box 462
SOUTHWESTERN DIVISION			
Los Angeles	W6LIP	Bruce T. Huntley	4570 San Blas
Arizona	W7CAF	Gary M. Hamman	1420 E. Missouri
New Mexico	W6LYF	Harold Lindsay	4126 Falcon St.
Santa Barbara	K6EAC	Edward J. Shedd	3018 Lomita Rd.
WEST GULF DIVISION			
Northern Texas	K5AEX	Robert G. Bender	c/o OGDAM Civil Defense
Oklahoma	W5UYQ	Ray K. Bryan	217 S.W. 61st Terrace
Southern Texas	W5QKF	Dr. R. O. Best	P.O. Box 1656
CANADIAN DIVISION			
Maritime	VE1BL	C. A. Smith	Transmitter Bldg., R.R. 1
Ontario	VE3KM	T. W. Clemence	2278 King St., East
Quebec	VE2QN	Felix Edge	2604 de la Pailasse Ave.
Alberta	VE5MJ	Sydney T. Jones	10706-57th Ave.
British Columbia	VE7KX	J. T. Hepburn	864 General Currie Rd.
Yukon			
Manitoba			
Saskatchewan	VE5IG	Harold Gronsdahl	
			Congress



Simplicity is the keynote of success in the Winthrop, Mass., RACES operations. This compact portable unit, operated by W1JL, was sufficient to effect communications between the Racing Committee boat and the Yacht Club in the July Interclub Sailing Boat Races—"RACES at the races."

The 160-meter band may be considered practically useless in some sections of the country, but out in the midwest it is widely used. In Pembina County, N. Dak., the RACES organization had itself an emergency drill on June 28, using 1900 kc. It was started at 1030 and conducted in accordance with the state RACES plan. K0HOZ, alternate RO and county EC, was in charge. The problem was to pick up election returns. RACES operators were used in addition to the some half dozen amateurs.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. The notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the
..... ARRL Section of the
Division, hereby nominate
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Term Ends
Yukon *	Oct. 10, 1960	W. R. Williamson	Mar. 17, 1949
West Indies	Oct. 10, 1960	William Werner	Aug. 10, 1958
Kentucky	Oct. 10, 1960	Robert A. Thomason	Aug. 16, 1960
Arkansas	Oct. 10, 1960	Ulmon M. Goings	Oct. 15, 1960
Idaho	Dec. 9, 1960	Mrs. Helen M. Maillet	Feb. 10, 1961
Colorado	Dec. 9, 1960	Carl L. Smith	Feb. 11, 1961
Minnesota	Dec. 9, 1960	Mrs. Lydia S. Johnson	Feb. 17, 1961
Sacramento Valley	Dec. 9, 1960	Jon J. O'Brien	Feb. 25, 1961
Eastern Florida	Dec. 9, 1960	John F. Porter	Feb. 27, 1961
Missouri	Dec. 9, 1960	C. O. Gosh	Mar. 1, 1961

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Noel B. Eaton, VE3CJ, R.R. 3, Burlington, Ontario. To be valid, petitions must be filed with him on or before closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Quebec	C. W. Skarstedt, VE2DR	June 10, 1960
Western Pennsylvania	Anthony J. Mroczka, W3UHN	Aug. 7, 1960
Vermont	Mrs. Harriet Proctor, W1EIB	Aug. 10, 1960
Northern Texas	L. L. Harbin, W5BNG	Aug. 10, 1960
Wyoming	Lial D. Branson, W7AMU	Aug. 22, 1960
Montana	Ray Woods, W7SFK	Sept. 1, 1960
Canal Zone	Thomas B. DeMeis, KZ5TD	Oct. 1, 1960
Northern New Jersey	J. Sparks Remeczky, K2MFF	Oct. 10, 1960

In the North Dakota Section of the Dakota Division, Mr. Harold A. Wengel, W0HYA, and Mr. E. J. Litton, K9KJR, were nominated. Mr. Wengel received 66 votes and Mr. Litton received 41 votes. Mr. Wengel's term of office began Aug. 19, 1960.

DXCC NOTES

Announcement is hereby made of eight new and separate additions to the ARRL's Countries List, DXCC credit claims may be made for these eight starting December 1, 1960. Claims for any of these eight received before December 1, 1960 will be returned without credit.

Four of these additions concern Republics formerly contained in the French West Africa listing. Contacts made on or after the date of independence for each of the following will be considered as separate from the French West Africa listing:

Dahomey Republic	August 1, 1960
Niger Republic	August 3, 1960
Voltaic Republic	August 5, 1960
Ivory Coast	August 7, 1960

The other four concern Republics formerly contained in the French Equatorial Africa listing. Contacts made on or after the date of independence for each of the following will be considered as separate from the French Equatorial Africa listing:

Chad Republic	August 11, 1960
Central African Republic	August 13, 1960
Congo Republic	August 15, 1960
Gabon Republic	August 17, 1960

Announcement is also made of the deletion of the French West Africa listing and the French Equatorial Africa listing. DXCC credit can be claimed toward the French West Africa listing for contacts made with the Dahomey, Niger, Voltaic, and Ivory Coast Republics prior to their independence dates listed above. DXCC credit can be claimed toward the French Equatorial Africa listing for contacts made with Chad, Central African, Congo, and Gabon Republics prior to their independence dates listed above.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WIAW will be made October 20 at 2130 Eastern Daylight Time (0130 GMT, October 21). Identical texts will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,900 and 145,800 kc. The next qualifying run from W6QWP only will be transmitted October 5 at 2100 PDST (0400 GMT, October 6) on 3590 and 7129 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from WIAW each evening at 2130 PDST (0130 GMT). Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the

order of words in each line of QST text sometimes is reversed. To improve your flat, hook up your own key and audio oscillator and attempt to send in step with WIAW.

Date Subject of Practice Text from August QST

- Oct. 3: *Experimental Transmitters* . . . p. 11
Oct. 6: *The Inverted V-Shaped Dipole*, p. 18
Oct. 11: *813s in Grounded-Grid*, p. 40
Oct. 17: *A Featherweight Array for 50-Mc.* . . p. 38
Oct. 25: *How to Win the . . . Sweepstakes*, p. 52
Oct. 27: *On Working Ws*, p. 54

BRIEF

The deluge of Field Day logs hitting the ARRL Communications Department was simply astounding. Initial indications are that all previous scoring records are to be seriously challenged if not surpassed, as well as the over-all number of those participating. As the log checking continues, it remains to be seen exactly what records were broken. In the meantime, stand by for the Field Day results soon to appear in QST. An Official Bulletin soon will be sent by WIAW and all Official Bulletin Stations giving those highest claimed scores.

DX CENTURY CLUB AWARDS

HONOR ROLL

ZL2GX	300	W3JNN	296	W1GKK	293
W1FH	300	W1ME	296	ZL1HY	293
W9NDA	299	W9YFV	295	W2BXA	293
W3GHD	299	W6EBG	295	W4DQH	292
W8HGW	299	W7GTV	294	W7ANX	292
W6AM	298	W6ENV	294	W6ADP	292
W2CK	297	W5ASG	294	CE3AG	292
W4RFD	297	W5MDM	294	W8TAS	292
W8JTN	297	W8BKP	294	W5ADZ	292
W2AGW	297	W9RBI	294	W6DZZ	292
W2HUQ	297	W7GHW	294	Z86HW	292
W8BRA	297	W8KT	294	W8LNU	291
KV4AA	296	G3AAM	293	W3BES	291
W6SYG	296	G2PL	293	W6FTT	291
W6CUQ	296			G4CFT	291

Radiotelephone

W2CK	297	W8RIS	289	W8KML	286
VQERR	292	W1FH	289	W8PQQ	285
Z86HW	292	W8HGW	288	4X4DK	285
W6GZ	291	W1JYN	288	ZL1HY	285
W8BF	290	W9RBI	288	W6AM	284
		W6YY	287		

From July 1, to August 1, 1960 DXCC Certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W2PEV	128	W7PCZ	104	K6ZIF	101
SM3AZV	122	W9YAE	104	W6ZSW	101
W6WNY	120	D10RH	104	W6ZSS	101
T2CMF	117	K3GBU	103	K7AAW	101
DLICF	115	K7GCM	103	G2VY	101
U8CKO	115	W1MWF	103	K2NMO	100
W7DWM	114	W8NPF	103	K4ZYU	100
J43EK	114	SM3AD	103	W6BDA	100
K1APQ	113	K2TDL	102	W6EOT	100
W2WTF	113	W7GPI	102	KH6DLF	100
K8DTZ	110	W8YNL	102	KL7TI	100
EA5BA	110	CT1IG	102	W8NAN	100
W1VKZ	109	W3CIR	101	K9LSN	100
OA4HK	109	W3GYP	101	FF8BF	100
Z12PM	109	W3INH	101	G3AEZ	100
K4HRY	106	J1KYG	101	J42AB	100
W9JO	106	W4LAV	101	OA4KF	100
K9QNT	106	W6LRD	101	ON4FK	100
K4QBP	105	K6QKH	101	VP3MC	100

Radiotelephone

EA7GF	163	YV5AIP	110	K1APQ	101
G3KHE	163	K4OGT	108	W1TRG	100
CE4BP	130	K9EMG	107	W2PTM	100
G3HJL	128	OA4HK	106	K6HYU	100
P21AX	128	YV5EF	106	W8DYY	100
W2PEV	122	J43EK	105	W8TTN	100
VE3BMB	116	K1DPI	103	W9PAO	100
W91VU	110	W1KYG	102	DL4GX	100
		VE1WL	102		

ENDORSEMENTS

W8TMA	261	K4RID	256	W5VU	232
W6CYV	260	Z2FXN	256	W3AYD	231
W4LYV	276	W2HSZ	250	W1EQ	230
W8WZ	270	KP4CC	250	K5GBB	230
G3AAE	262	W2EQS	240	VE2NV	230
W2BRV	261	K21WB	240	W1TS	227
W3NKM	260	W7AUS	240	W2KJZ	223
W4AZK	260	K9BVR	240	K4HRG	222
G3HLS	260	W4PLL	232	W1HGT	220

W2BUI	220	W9PVA	175	ZL1NG	142
DJ2AE	214	W6FLT	173	K2TQC	140
I1UA	214	W7CMO	173	W6VVR	140
Z1ABO	213	VE3ADV	173	W8ZNO	140
W1LQ	211	I1RC	173	W4RTW	139
W1RAN	210	W3HDZ	172	K9GTK	139
W2QKJ	204	SM6VY	171	DL1FZ	139
W8HFW	202	W4CKB	170	ZETAD	139
W91TR	202	W4JL	170	W7LIO	137
W9U2S	202	W6PHF	170	KP4AOO	137
H9NUC	202	EA7CP	170	K4ELK	135
F8EJ	201	SM5BPJ	161	Z85LY	134
W2PZY	200	W2ZKQ	160	DJ4TZ	132
W27TP	200	K81SG	160	UO5AA	132
W2VYX	200	K9KDI	160	VE1ADE	130
W7ZAS	200	VE1WL	160	K6ANP	130
W9HXL	200	VE2BK	160	W9RZU	130
K84JO	193	VE3CIO	160	VE1ADE	130
K4LTA	194	G5VU	160	W9PVM	129
W3DPS	193	W8KBT	157	W5OJL	128
W4NT	193	SM3AZI	156	K1IJG	124
8T2AR	192	W6JH	155	W2RHH	123
G2BVN	191	F8GB	154	K4BUJ	123
W1OHA	190	W5JRG	153	I1ZCN	122
W5PSB	190	W1IKR	152	VE2TP	121
W8DEL	189	Z6JY	151	G3JFB	121
ON4FL	187	K4YCW	150	K1IFJ	120
W6TDD	185	W5CPW	150	W6AGM	120
W3RHU	182	K9BGL	150	K6RAL	120
W11U	181	K9PPX	150	DJ4OP	120
W1ZDZ	181	K9PTE	150	W61JH	118
W6MVL	180	PA8FA	150	W7KOF	118
X2ZFL	181	W8OUH	148	ELAA	112
W8TTN	180	K9GVE	145	K4ZKZ	111
W6QAG	180	G2RI	145	W4OHT	110
W4WSJ	176	K1BEB	143	J2HHA	110

Radiotelephone

W9WHM	270	W4WSJ	176	W4QT	142
W9YSQ	260	ON4BX	174	SM3AZI	142
W3WZ	251	W5WZ	172	W3VSU	141
W4ANE	250	CT1MB	171	L1UDJU	132
W5VU	221	PA8ZD	171	F9MD	131
W3NKM	213	W2QKJ	170	K4LEO	129
W1LLF	210	VE3JZ	170	K6HAP	121
W4NYN	210	G4W	165	VE3BTI	121
I1UA	210	W1BIH	162	K8RTW	120
PA8HB	207	W8NLI	162	K5RUU	119
H9NUC	201	W3AYD	161	K9ECE	119
G3AAE	196	W4RVL	161	W9ZTD	117
W1RAN	193	W2WCY	160	W9PVA	112
W1HJB	191	W7HJL	160	W3YLL	112
W6QOG	191	W2HQL	157	W9WIO	112
W48KO	181	K9KYF	153	K2TAP	111
W5AFX	180	T7CKV	145	K1BEB	111
X2ZFL	178	W7ZAS	144	W9LXW	110
		K4HRG	142		

U.S.-Canada Area and Continental Leaders

KH6CD	261	VO1DX	230	VE6NX	256
KL7PL	231	VE2WW	276	VE7ZM	285
W8ELA	285	VE3DIF	260	VE8AA	195
VE1PQ	250	VE4XU	180	4X4DK	288
		VE5JV	200		

Radiotelephone

W2BXA	274	W8A1W	270	VE3QA	224
W4DQH	273	W11DE	147	VE4RP	102
W8PGB	260	VO1DX	110	VE8RU	178
KH8OR	254	VE2WW	220	VE8TF	160
W7PHO	283	VE3KF	224	VE7ZM	267
W1FAFR	190			G2PL	266

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: DUL, PAM: IVS, RM: AXA. The Pennsylvania Phone Net meets nightly Mon. through Fri. at 1800 EST on 3550 kc. The EPA C.W. Net meets every evening at 1830 EST on 3610 kc. All traffic nets have returned to Eastern Standard Time. AMC and TCC set up a station at the Leuga Council Boy Scout Jamboree. WHK was ham radio counsellor at Camp Akiba and K3DEM was counsellor at Camp Mimi. K3JXN will replace K3ANS as OBS on the PFN Net. HNK is NCS on the PFN each Mon. evening. Awards: DXCC to GYP, W-21 to AXT, RCC and CP-20 to K3LITZ. K3IPK is now using a DX-2CC for his traffic load. K3HHU and DGX spent a week vacationing at the shore with W3HUL. The EPA C.W. Net is on the lookout for a Scranton Area outlet. EML is QRL getting the Philadelphia Electric Club station in working order; the call is K3LDD. NNL reports the UTL Net now meets on 7075 kc. at 2100 EST daily instead of on 3565 kc. NF is sending high-speed code transmissions on 3520 kc. at 8:30 P.M. HUR is reconditioning his antenna farm and beams for the coming cold season. BFF spent a few weeks at the VA hospital and was visited by KMD, ZIV and ZLP. OY and KMH swapped stories when they met in a New Jersey parking lot. YLL was a western states visitor and stopped in to assist KVX print his DX Magazine. EU had too many visitors at his shack and it cut into his traffic skulls. K3CVF has joined the "Pack Rats." K3JHE is on 50-Mc. c.w. ZRR is invading 220 Mc. New officers of the Hellertown ARA are K3ALV, pres. K3EXV, vice-pres. K3BLN, treas.; K3HFX, secy. K3KNN is now General Class. K3CNR put up a 20-meter folded dipole, BNR/6 is on 80 through 10 meters and sends his regards to the PFN gang. K3ACD is an Official Observer. NNC, an Observer, has made an average discrepancy report of 75 stations over the past 4 months; 95 per cent were for harmonics. K3KUD is a new OBS. SAO spent two weeks vacationing in the hill country with the Mahanoy Valley Brass Pounders. Traffic: W3CUL 4926, VR 594, IVS 452, HNK 305, WHK/3 185, K3ALD 171, DCB 106, W3AXA 100, EML 81, K3IPA 79, HXC 65, W3KMD 64, K3HEX 60, W3NNL 57, K3DEM/3 54, W3NF 41, FAF 37, ZRQ 33, K3HHU 28, IPK 28, W3ZLP 27, LU 22, AMC 20, K3ANS 19, AOX 14, W3BLR 14, K3GAY 13, JSX 12, W3BHF 11, FKE 9, K3AHT 8, CAH 8, GST 8, W3ITI 8, NQB 8, OY 4, DUT 3, GYP 2, K3ACD 1, W3JNQ 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Thomas B. Hedges, W3BKE—SEC: PKC. MDD Traffic Net meets on 3650 kc. Mon. through Sat. at 1915 EST. MEPN (phone) on 3520 kc. Mon., Wed. and Fri. at 1800 and Sat. and Sun. at 1300 EST. MDDS and MSN (slow speed) Nets on 3650 kc. at 1845 and 2030 EST. New appointments: STG and YTW as OBS; K3CRF and K3JIQ as OBSs; K3HWD as OBS. There are openings for ECs in Caroline, Charles, Dorchester, Frederick, Harford, Howard, Montgomery, Somerset and Worcester Counties in Maryland. Let's hear from some prospective appointees. ARA maintains its record OO activity in spite of hot weather. K3ANA is building a new final. BUD reports that the St. Marys ARA is active and enjoyed meeting a delegation from Calvert County at a recent meeting. CPM says he will be back on the air soon. Old-timer CQS has a new 10-meter beam. CVE is busy with OB and EC activity. K3CXX reports in from Baltimore. The FRC entertained K3HUL at a recent dinner meeting. K3CYA made a good start with his OO activity. EFZ slowed down during the summer doldrums. EOV is now on RTTY

and wants to contact others in this section interested in teletype. 4EXM/3 will continue to use his portable call and reports his S-Line equipment is working fine. The Anne Arundel RC gave valuable communications assistance at a forest fire! Good work, K3GBV reports plenty of 2-meter work is keeping him busy. K3GKF is pleased with reports on his OBS transmissions. K3GZF reports in from Bel Air. HCE is busy with OO work. K3HDW reports several good 144-Mc. openings. EXU reports the Free State ARC is keeping up its activity during the summer. New OBS K3HJD has a 2-meter mobile rig. HKS keeps Delaware on the traffic nets. K3HPG graduated from high school and will have more time for OBS work. K3HTE has a new 20A and 2 4X250Bs with a kw. on s.s.b. New OBS K3JIQ sends in a good traffic report. JME is active in the Baltimore County Emergency Net. JWN 4 reports in by telegraph from North Carolina. JZY operated mobile on a trip to the West Coast. KA built a new electronic keyer and will burn up the SS this year. KHA reports in from Baltimore. KLA keeps his OO activity up. K3KPZ has a new Apache and reports the Chesapeake ARC is planning a heavy fall schedule. K3LLR has a new antenna. K3MDL is a new reporter. OSF is active as an OO. TN made BPI again. TSG has a new operator. Congratulations! UE keeps after the 3RN boys and keeps the net at the top in activity. K3WBJ reports in again from Walter Reed Hospital. New OBS YTW reports in from U. of Md. ZAQ is moving to a new QTH. ZGN reports from College Park. ZNW is busy with plans for a station at the Calver County Fair. Remember the Foundation at Gaithersburg, Md., Oct. 2. Traffic: W3TN 205, UE 167, K3WBJ 61, W3AHQ 37, BKE 33, K3KPZ 32, JIQ 31, W3ZNV 29, YTW 26, CVE 23, TSG 22, EOV 21, BUD 14, K3GZK 13, AXA 9, W3CQS 9, KA 5, K3N3MDL 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BJG—SEC: W2LW, RMs: W2BZK, W2HDW and W2LI. Two new appointees are K2JJC, Pitman, as OBS, and K2RXB, Margate, as OPS. K2SNK, Trenton, has received a net certificate for activity in the N. J. Phone and Traffic Net. K2DEI, Maple Shade, continues in the BPL class. Much of his traffic is handled through Cape Christian, N. J. Phone and Traffic Net totals for July are 31 sessions, stations 710 and traffic 120. W2ZLI, the Foundation at Gaithersburg, Md., Oct. 2. Traffic: W2BZJ, Pennington, is back on NJN after a fling at DXing. K2CPR, Pennsauken, DXCC totals are now 255/250. Jack has received 56 certificates and CHC No. 40. W2RXL, NJN manager, has issued a revised roster. NJN's July traffic total was 348. A report was received from the Bridgeton Area Radio Club through its secretary, H. J. Stennens. WA2ANH has returned from a trip to England and Scotland. WA2ECR has been elected a director of the Gloucester Co. ARC. WA2AFZ is the club secretary. K2UDA and K2MKD are vacationing in N. Y. State; both are on 2 meters all the way. W2EXB hopes to sign VEI during his Nova Scotia vacation. W2BV, Minnetola, has a new antenna. K2YIB, SJRA v.h.f. chairman, presented the ARRL gavel to the club president, W2REB, at SJRA's July meeting. The following continued all SJRA's Field Day stations and were presented with achievement certificates: W2BLV, K2BZK, W2FXN, K2GSJ, W2HBE, W2LBX and W2PAU. W2BLV has now worked 30 states on 2 meters. W2BBD has been appointed civil defense director of Haddon Heights. Southern Counties ARA issues a certificate for prospective five of its members. The club meets the 2nd Fri. in Pleasantville, the Burlington Co. Club the 1st Fri. and the Levittown (N. J.) Club the 1st Tue. Traffic: K2DEI 164, W2RG 116, W2TLO 63, W2BZJ 58, W2ZI 44, K2RXB 33, K2IGU 32, K2JJC 21, K2SOX 17, K2SNK 9, W2BEI 4, W2IU 4, K2CPR 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE, RMs: W2RUF and W2ZRC. PAM: W2PVI. NYS C.W. meets on 3615 kc. at 1900; ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 1800; NYS C.D. on 3510.5 and 3993 kc. at 0900 Sun.; TCPN 2nd call area on 3970 kc. at 1900; IPN on 3980 kc. at 1600. W2EZB takes BPL honors this time. K2IMK has been endorsed as OBS. W2RUF has a Ranger and a Courier linear. K2ZVD reports that the WNYVHS Hamfest at Great Valley was FB. The Sid-

(Continued on page 108)

FASTEN YOUR SEAT BELT AND CHECK YOUR AIR SPEED

(Part I of II)

IN the last decade all manner of long-standing records have been broken . . . the 4-minute mile, now less than 4 minutes; high jump 7 feet, $3\frac{3}{4}$ inches; the shot-put 65 feet, plus; and golf scores below par. Only Babe Ruth's record of 60 home runs in 1927 remains intact. The "Fastest Gun" falls by the wayside on TV each week.

WHICH is by way of saying, "What has this to do with amateur radio?" An urgent word of careful caution must be injected here to say this in no way intends to suggest or encourage speed before or without accuracy.

MANY of our present day c.w. amateur operators have approached operating "air speeds" heretofore attained only by mechanically actuated commercial gear such as the Wheatstone, Boehme and Creed "transmitting heads". Of course, these instruments are fed with perforated tape from the Kleinschmidt or similar perforator. Tape is "cut" by skilled typists, 90 or more w.p.m. At the receiving end, an ink recorder forms the dots and dashes into letters on a paper ribbon, usually called "slip". Top flight operators copy 90 w.p.m. using the audio and visual signals on high speed circuits.

ALL of this specialized mechanical gear is beyond the thin wallet of the radio amateur, so he has had to find some other way to do it. True, he cannot compete with very expensive gear, but neither can a gazelle compete with the modern racing automobile. But, Mr. Radio Amateur "Ain't just a-sittin' either".

LET's turn time and pages of *QST* back to February, 1934, "How's Your Fist?" by W9UZ (now W4CF). The opening paragraph, page 18: *"The goodness or badness of somebody's fist is a matter which must be handled rather gently. It is a delicate subject. The human ear reproduces faithfully everything it hears and passes it along to the brain. But brains seldom agree. By using something entirely mechanical, therefore, we remove the greatest error-making device involved. The mechanical visual recorder provides a record that can be seen, measured and inspected."*

Now to *QST*, April, 1936, page 62: *"Assume that a 'Highspeed bug merchant' promises to deliver signals at 45 w.p.m. That is one big promise which will be filled by very, very few amateurs. Of hundreds which have been recorded at W9UZ, no one has approached that speed."* That was in 1936.

LOOKING at that whole page of "Fists I Have Seen" in *QST*, March, 1936, page 23, and listening to these "wizards of this 1961 space age" in that 7.0-mc slip stream (7,006 to 7,018 kc), those 1936 records truly are but dim images of the past.

WHAT has happened (TO BE CONTINUED NEXT MONTH)

— FRED SCHNELL, W4CF

Buell Gallagher Jr.

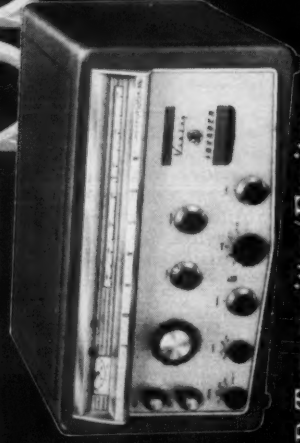
W. J. Haggan W9AC

hallicrafters

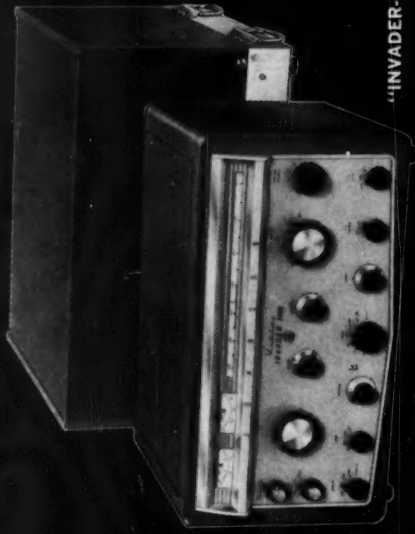
SSB

A totally new concept in transmitter design — FILTER-TYPE

TRANSMITTER/EXCITER/AMPLIFIER



"INVADER"



"INVADER-2000"

*A superbly engineered SSB Transmitter/Exciter
...add hi-power conversion for 2000 watts P.E.P.
(twice average DC) input SSB!*

Here is the most versatile... most advanced SSB Transmitter/Exciter/Amplifier package ever designed for the amateur service! Excitingly different—from exclusive filter-type circuitry to distinctive front panel and cabinet design—the Viking "Invader" and the "Invader-2000" offer flexibility and performance for a lifetime of operating pleasure.

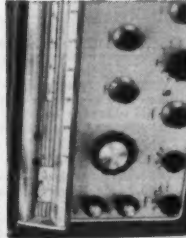


Viking

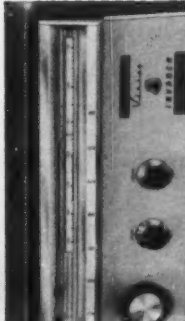
INVADER • INVADER-2000



CRYSTAL FILTER-TYPE SIDEBAND
—Exclusive high frequency bandpass crystal filter gives you more than 60 db of unwanted sideband and carrier suppression. Control knob at top of front panel "mode" switch.



SIMPLIFIED OPERATION — Unique design and circuitry make the "Invader" and the "Invader-2000" extremely easy to use. You're ready to go—just a few front panel controls give complete flexibility!



FREQUENCY CONTROL — Instant bandswitching to select of the full 2000 watt CW and SSB bands. No extra crystals or retuning required. Highly stable, built-in VFO is differentially compensated and automatically "keeps warm" heater element keeps VFO at operating temperature even with equipment turned off... NO WARM-UP DELAY!



Write today for your free 8-page "Invader" brochure—complete with detailed specifications and photographs!

Here's the transmitter with the sharp, penetrating signal you've been waiting for—plus more exclusive operating and convenience features than any other Transmitter/Exciter on the market today! The "Invader" offers instant bandswitching, full bandspread coverage 80 through 10 meters—no extra crystals to buy—no retuning necessary! On AM! Solid 2000 watts CW and SSB input; 90 watts input on AM! Final amplifier utilizes a pair of 6146's in parallel, bridge neutralized. Unwanted sideband and carrier suppression is 60 db or better! Exclusive RF controlled audio AGC and ALC (limiter type) provide greater average speech power—high gain push-to-talk audio system has plenty of reserve gain for either crystal or dynamic microphones. VOX and anti-trip circuits are extremely smooth in operation—built-in anti-trip matching transformer—adjustable VOX time delay circuit. Mixer-type shaped keying is crisp, sharp—click and chirp free. Single knob wide range ping network output circuit. Fully TVI suppressed. Blocking and operating bias provide noise-free T-R switch operation. Heavy duty power supply is completely self-contained. The "Invader" may also be used as an exciter for the Viking "Courier", "Thunderbolt", or the Viking "Kilowatt". Dimensions: 11 1/2" high x 21" wide x 17 1/2" deep. Compact, heavy duty power supply with swinging choke circuitry gives excellent voltage regulation—supplies all necessary high and low voltages. Power Requirements: 325 watts, 105-125 V AC 2-wire, 50-60 cycle.

Cat. No. 240-302-2 ... Viking "Invader" wired and tested with tubes, crystals, less key and microphone.

Amateur Net \$619.50

Available completely factory wired and assembled, the "Invader-2000" offers all of the fine features of the "Invader" plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Here's desk-top operating convenience unsurpassed by any other high power transmitter... 2000 watts P.E.P. (twice average DC) input on SSB, 1000 watts CW, and 800 watts AM input! Final amplifier employs two rugged, high efficiency, low replacement cost Type PL-175A pentode tubes in parallel... features a ganged tank assembly that cut off exceptionally uniform "Q". RF stages are cut off automatically on stand-by and key-up—wide range output circuit (40 to 600 ohms adjustable) will match virtually any antenna system. Push-pull fan assembly draws air through the chassis, effectively cooling components as well as filament and plate seals for extended tube life. Heavy duty, multi-section power supply uses 866A High Voltage Rectifiers. Screen supply employs a 5U4-GA rectifier and uses heavy bleeder and high filter capacity for excellent dynamic screen voltage regulation in Class AB2 operation. An OC2 bias regulator provides regulated bias for the two PL-175A final amplifier tubes. Dimensions: 11 1/2" high x 21" wide x 17 1/2" deep. Power Supply: 11 1/2" high x 19 1/4" wide x 14 1/2" deep. Power Requirements: 1600 watts, 105-125 V AC 2-wire; or 210-250 V AC 3-wire, 50-60 cycle.

Cat. No. 240-304-2 ... Viking "Invader-2000" wired and tested with remote power supply, tubes, crystals, less key and microphone.

Amateur Net \$1229.00

VIKING "INVADER" HI-POWER CONVERSION—Take the features and performance of your Viking "Invader"... add the power and flexibility of the unique Viking "Hi-Power Conversion" system... and you're "on the air" with the "Invader-2000"—a solid 2000 watts P.E.P. (twice average DC) input SSB, 1000 watts CW and 800 watts input on AM! Completely wired and tested—includes power supply, new front overlay panel, extra knobs, additional meter, necessary tubes—everything you need to convert your "Invader" into the power-packed "Invader-2000". All you need is a small wrench and a screwdriver—no soldering necessary—complete the entire conversion in just one evening!

Cat. No. 240-303-2 ... Hi-Power Conversion, complete

Amateur Net \$619.50



FIRST CHOICE AMONG
THE NATION'S
AMATEURS

Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA

Viking transmitters and accessories... 1st choice of amateurs the world over!

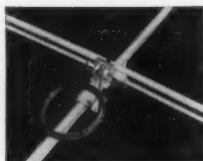
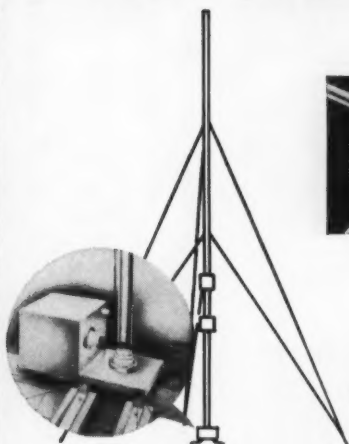


NEW... FOR 10 METERS!

10-Meter Messenger

Ideal for fixed or mobile operation, the new 10-meter "Messenger" is a complete 10-tube (including rectifier) crystal-controlled transceiver! Superhet receiver offers excellent sensitivity and selectivity—with effective ANL, AVC, and Squelch circuits. 10 watts input delivers a solid signal. Wide range pi-L network output circuit—self-contained power supply. Pre-tuned for 29.4 to 29.7 mcs—covers any 5 frequencies within a 300 kc segment of the 10-meter band. Compact... lightweight... easy to install. 5½" high, 7" wide, and 11¼" deep. For 6V D.C. and 115 volts A.C., 12V D.C. and 115 volts A.C., or 115 volts A.C. only. Complete with tubes, microphone, power cords, and crystals for one frequency covering 29,640 kc, national calling and emergency frequency. For complete details write for specification Sheet 737.

Cat. No.	Amateur Net
242-201... 115 V only	\$129.75
242-202... 115 V & 6 V	\$139.75
242-203... 115 V & 12 V	\$139.75



138-420-3

137-102

PRE-TUNE BEAMS—Rugged semi-wide spaced beams—pre-tuned for 20, 15, and 10 meters. Low SWR. With 3 element beams, boom and balun. For 52 ohm coaxial transmission line.

Cat. No.	Amateur Net
138-420-3... 20 meter beam	\$139.50
138-415-3... 15 meter beam	\$110.00
138-410-3... 10 meter beam	\$ 79.50

"MATCHSTICK"—A fully automatic bandswitching vertical antenna system—may be mounted on roof top, ground, or in any limited space location. Completely pre-tuned—low SWR on all bands 80 through 10 meters. Low vertical radiation angle for DX. Impedance: 52 ohms. Complete with 35' mast, base tuning network, relays, control box and 9 Dacron guy ropes.

Cat. No. 137-102	Amateur Net \$129.50
------------------	----------------------

"MATCHBOXES"—Provide completely integrated antenna matching and switching systems for kilowatt or 275-watt transmitters. Bandswitching 80, 40, 20, 15, and 10 meters. No "plug-in" coils or "load-tapping" necessary.

275 Watt "Matchbox"—Designed to match a 52 ohm coaxial link line to reactive and nonreactive loads ranging from 25 to 1500 ohms for balanced lines; and 25 to 3000 ohms for unbalanced lines. For transmitters with a maximum power input of 275 watts.

Cat. No.	Amateur Net
250-23-3... With directional coupler and indicator	\$86.50
250-23... Less directional coupler and indicator	\$34.95

Kilowatt "Matchbox"—Handles unbalanced line impedances from 50 to 2000 ohms, and balanced line impedances from 50 to 1500 ohms. For transmitters with a maximum power input of 1000 watts.

Cat. No.	Amateur Net
250-30-3... With directional coupler and indicator	\$149.50
250-30... Less directional coupler and indicator	\$124.50

250-30-3

250-23-3

COMING SOON... the all new Viking filter-type sideband transmitter with 60 db sideband suppression!



The world at your finger tips!

VIKING "KILOWATT" AMPLIFIER—The only power amplifier available which will deliver full 2000 watts SSB* input, and 1000 watts CW and plate modulated AM. Continuous coverage 3.5 to 30 mcs. Excitation requirements: 30 watts rF and 10 watts audio for AM; 10 watts peak for SSB.

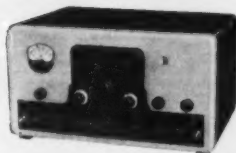
Cat. No. **Amateur Net**
240-1000 ..Wired and Tested.....\$1595.00
251-101-1 ..Matching desk top, back and 3 drawer pedestal, FOB Corry, Pa.\$132.00

*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions, this results in peak envelope power inputs of 2000 watts or more, depending upon individual voice characteristics.



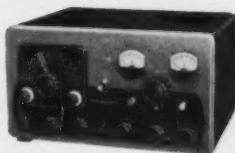
"RANGER" — 75 watts CW and 65 watts phone input. Bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes.

Cat. No. **Amateur Net**
240-161-1 ..Kit\$229.50
240-161-2 ..Wired\$329.50



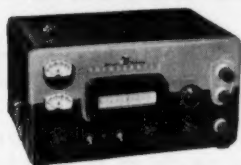
"VALIANT"—Instant bandswitching 160 through 10. 275 watts input CW and SSB (P.E.P. with aux. exciter) 200 watts phone. With tubes.

Cat. No. **Amateur Net**
240-104-1 ..Kit\$349.50
240-104-2 ..Wired\$439.50



"FIVE HUNDRED" — 600 watts CW input; 500 watts phone and SSB (P.E.P. with aux. SSB exciter). Bandswitching 80 through 10. With tubes.

Cat. No. **Amateur Net**
240-500-1 ..Kit\$749.50
240-500-2 ..Wired\$949.50



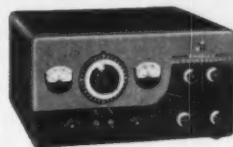
"THUNDERBOLT" AMPLIFIER—2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear. Continuous coverage 3.5 to 30 mcs. With tubes.

Cat. No. **Amateur Net**
240-353-1 ..Kit\$524.50
240-353-2 ..Wired\$589.50



"6N2"—Instant bandswitching coverage of both 6 and 2 meters. Power input rated at 150 watts CW, and 100 watts AM phone. With tubes.

Cat. No. **Amateur Net**
240-201-1 ..Kit\$129.50
240-201-2 ..Wired\$169.50

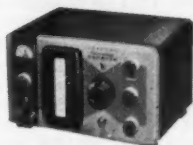


"6N2" THUNDERBOLT AMPLIFIER—Input rated 1200 watts P.E.P.* SSB and DSB, Class AB; 1000 watts CW, Class C; 700 watts AM linear, Class AB. Continuous coverage 6 and 2. With tubes.

Cat. No. **Amateur Net**
240-362-1 ..Kit\$524.50
240-362-2 ..Wired\$589.50

"COURIER" AMPLIFIER — Class B linear rated 500 watts P.E.P. input with auxiliary SSB exciter; 500 watts CW; 200 watts AM. Continuous coverage 3.5 to 30 mcs. With tubes.

Cat. No. **Amateur Net**
240-352-2 ..Wired\$289.50



*New
Catalog*

Your complete guide to amateur radio's most exciting equipment. Write today for your free copy.

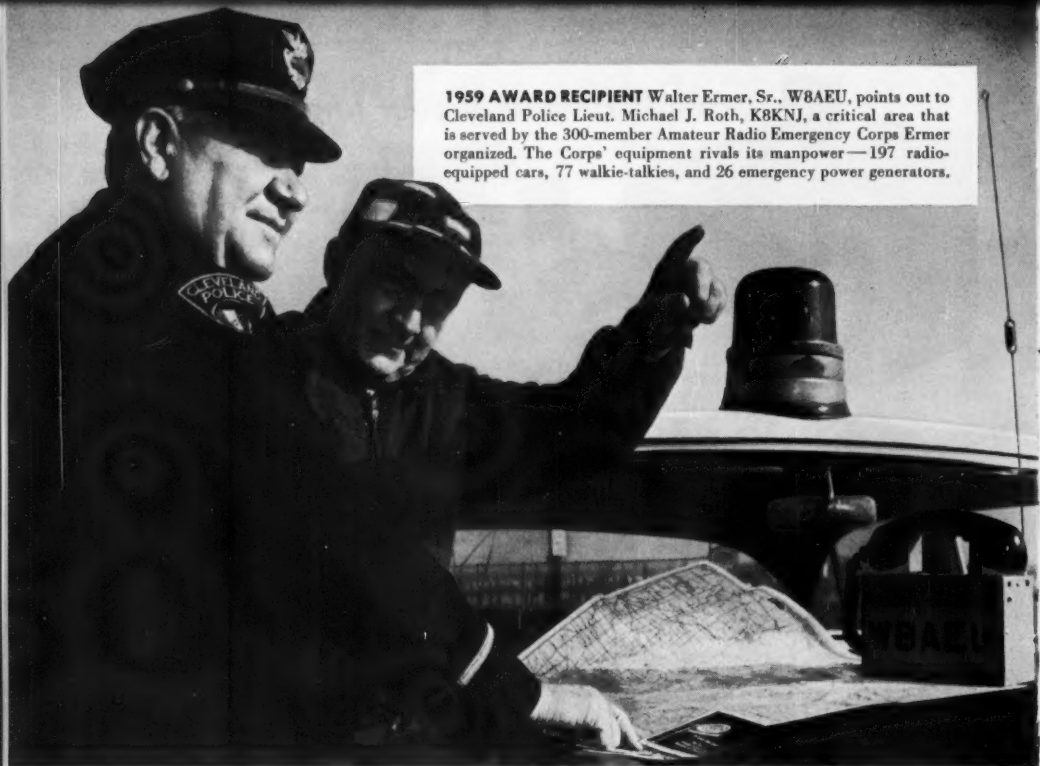


**FIRST CHOICE AMONG
THE NATION'S
AMATEURS**



Viking

E. F. JOHNSON COMPANY • WASECA, MINNESOTA



1959 AWARD RECIPIENT Walter Ermer, Sr., W8AEU, points out to Cleveland Police Lieut. Michael J. Roth, K8KNJ, a critical area that is served by the 300-member Amateur Radio Emergency Corps Ermer organized. The Corps' equipment rivals its manpower—197 radio-equipped cars, 77 walkie-talkies, and 26 emergency power generators.

Nominations Open for 1960 Edison Award

Eight previous annual Edison Radio Amateur Awards have honored hams who rendered important public service. The ninth Edison Award, for 1960, will follow the same distinguished pattern as its predecessors.

A panel of impartial judges—all men of national standing—will select the Award recipient, from a group of candidates made up entirely of

names which you and others submit by letter.

You will help raise the stature of *all* radio amateurs by naming a suitable candidate for the acclaim, trophy, and gift that go with the Edison Award. See rules below for help with your nominating letter! Mail it to *Edison Award Council, General Electric Company, Electronic Components Division, Owensboro, Kentucky.*

RULES OF THE AWARD

WHO IS ELIGIBLE. Any man or woman holding a radio amateur's license issued by the F.C.C., Washington, D.C., who in 1960 performed a meritorious public service in behalf of an individual or group. The service must have been performed while the candidate was pursuing his hobby as an amateur within the limits of the United States.

RECIPIENT OF THE AWARD will receive the Edison trophy in a public ceremony in Washington, D.C. Expenses of his trip to that city will be paid.

\$500 GIFT. Recipient will be presented with a check for this amount in recognition of the public service which he has rendered as a radio amateur.

WHO CAN NOMINATE. Any individual, club, or association familiar with the public service performed.

HOW TO NOMINATE. Include in a letter a full description of the service performed, as well as the candidate's name, address, and call letters. Your letter of nomination must be postmarked not later than January 2, 1961.

BASIS FOR JUDGING. All entries will be reviewed by a group of distinguished and impartial judges. Their decisions will be based on (1) the greatest benefit to an individual or group, (2) the amount of ingenuity and sacrifice displayed in performing the service. Edison Award judges will be:

E. ROLAND HARRIMAN, Chairman, The American National Red Cross.

ROSEL H. HYDE, Commissioner, Federal Communications Commission.

GOODWIN L. DOSLAND, President, American Radio Relay League.

Recipient of the Award will be announced on or before Thomas A. Edison's birthday, February 11, 1961.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.

GENERAL  ELECTRIC

024-401

FROM HEATH ... 9 NEW RADIO AMATEUR KITS



GC-1

\$10995

\$11.00 dn.,

\$10.00 mo.



TEN-TRANSISTOR "MOHICAN" GENERAL COVERAGE RECEIVER KIT (GC-1)

An excellent portable or fixed station receiver! Many firsts in receiver design for outstanding performance . . . ten transistor circuit . . . flashlight battery power supply . . . ceramic IF transfilters. The amazing, miniature transfilters used in the GC-1 replace transformer, inductive and capacitive elements used in conventional circuits; offer superior time and temperature stability; never need alignment and provide excellent selectivity. Other features include telescoping 54" whip antenna, flywheel tuning, tuning meter, large slide-rule dial and attractive, rugged steel case in gray and gray-green. Covers 550 kc to 30 mc in five bands. Electrical bandspread on five additional bands cover amateur frequencies from 80 through 10 meters. Operates up to 400 hours on 8 standard size "C" batteries. Sensitivity: is 10 uv, broadcast band; 2 uv, amateur bands for 10 db signal to noise ratio. Selectivity: 3 kc wide at 6 db down. Measures only 6 1/2" x 12" x 10". 20 lbs.

Heathkit XP-2: plug-in power supply for 110 VAC operation of GC-1. (optional extra). 2 lbs. **\$9.95**



HD-20

\$1495

100 KC CRYSTAL CALIBRATOR KIT (HD-20)

Align or check calibration of your communications gear with this versatile ham aid. Provides marker frequencies every 100 kc between 100 kc and 54 mc. Transistor circuit is battery powered for complete portability. Accuracy is assured by .005% crystal furnished. Measures only 2 1/2" x 4 1/2" x 2 3/8". 1 lb.

7 more kits on following pages

HEATHKIT® . . . WORLD'S FINEST HAM GEAR



KL-1
\$399⁹⁵

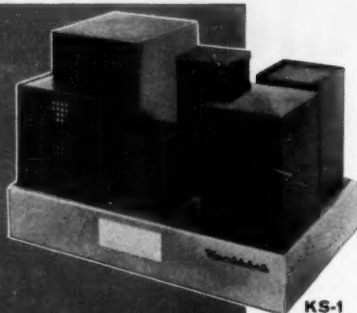
\$40.00 dn.
 (Write for time
 payment details)

"CHIPPEWA" KILOWATT LINEAR AMPLIFIER KIT (KL-1)

Here is a top-quality kilowatt rig with all the features you've been looking for. Operates at maximum legal power input on all bands between 80 and 10 meters, in SSB, CW or AM linear operation. Premium tubes (4-400A's), forced air cooled with centrifugal blower. Grid neutralized, continuous plate current monitoring, extensive TVI shielding. Features both tuned and swamped grid circuits to accommodate all popular exciters. Operates class A1 for SSB and AM linear service and high efficiency class C for CW service. Convenient panel controls include power switch, tune-operate switch, HV on/off switch, final bandswitch, meter switch, grid bandswitch, grid tuning, mode switch, plate tuning, plate loading and bias adjust. Accessory connectors are provided on the rear apron of the chassis for complete compatibility with all control circuitry in the Heathkit "Apache" Transmitter. Two meters provided; one monitors final plate current; the other indicates switch selected readings of final grid current, screen current, and plate voltages. Send for complete specifications now. 70 lbs.

A PERFECT COMPANION FOR THE "CHIPPEWA" KILOWATT POWER SUPPLY KIT (KS-1)

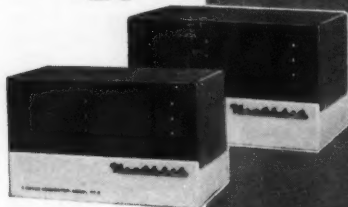
Ruggedly constructed for heavy-duty use in medium to high power installations, the KS-1 fills the requirements of a top-notch power supply with economy and safety. Features an oil-filled hermetically sealed plate transformer, "potted" swinging choke input filter and 60-second time delay relay. Line filters minimize RF radiation. Maximum DC power output is 1500 watts. Nominal voltage output, 3000 or 1500 volts. DC current output, average 500 ma, maximum 1000 ma. Control circuitry is arranged to allow remote installation. The KS-1 employs two 866A half-wave mercury vapor rectifiers in a full-wave, single-phase configuration. Power requirements: 115 V, 50/60 cycles, 20 amperes; 230 V, 50/60 cycles, 10 amperes. 105 lbs.



KS-1
\$169⁹⁵

\$17.00 dn.,
 \$15.00 mo.

XC-6
\$26⁹⁵



XC-2
\$36⁹⁵

6-METER CONVERTER KIT (XC-6)

Extends frequency coverage of the Heathkit "Mohawk" and most other general coverage receivers into the 6 meter band. Converts 50-54 mc signals to 22-26 mc. 3-tube circuit provides two RF stages and low-noise triode mixer. Calibration accuracy assured by .005% overtone crystal supplied. Provision for external RF gain control. 6 lbs.

2-METER CONVERTER KIT (XC-2)

This top-quality 2-meter converter may be used with receivers tuning any 4 mc segment between the frequencies of 22 and 35 mc when appropriate crystal is used. Converts 144-148 mc signals to 22-26 mc with .005% overtone crystal supplied. High quality parts used throughout. Silver plated chassis and shields. 7 lbs.

IN KIT FORM TOPS IN TRANSMITTING POWER

TWO BRAND NEW MODELS

HEATHKIT 10 & 6 METER TRANSCEIVER KITS

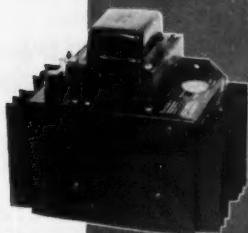
Complete ham facilities at low cost! The new Heathkit transceivers are combination transmitters designed for crystal control and variable tuned receivers operating on the 6 and 10 meter amateur bands (50 to 54 mc HW-29 and 28 to 29.7 mc for HW-19) in either fixed or mobile installations. Highly sensitive superregenerative receivers pull in signals as low as 1 microvolt; low power output is more than adequate for "local" net operation. Other features include: built-in RF trap on 10 meter version to minimize TVI; adjustable link coupling on 6 meter version; built-in amplifier metering jack and "press-to-talk" switch with "transmit" and "hold" positions. Can be used in ham shack or as compact mobile rigs. Not for Citizen's Band use. Microphone and two power cables included. Handsomely styled in mocha and beige. Less crystal. 10 lbs.

VIBRATOR POWER SUPPLIES: VP-1-6 (6 volt), VP-1-12 (12 volt). 4 lbs. Kit; \$8.95 each, wired; \$12.95 each.



HW-19 (10 meter)
HW-29 (6 meter)

\$39.95 each



HP-10
\$44.95

NEW! IMPROVED DESIGN

TRANSISTOR MOBILE POWER SUPPLY (HP-10)

Brand new power supply for mobile gear; features all-transistor circuit, instant starting, high efficiency, rugged construction. Operates from 11 to 15 VDC input; at 12 VDC, provides 600 VDC @ 200 ma, or 600 VDC @ 150 ma & 300 VDC @ 100 ma simultaneously, at 120 watts. Negative 150 volts @ 30 ma also provided. Max. ambient temp., 150 @ 120 watts ICAS. Input current requirements: 2 amps, idling; 13 amps, full output. Includes heavy filtering of input and output leads, remote relay control of primary power, silicon rectifiers, and extruded aluminum heat sinks for efficient cooling of power transistors. Measures 8" x 7 1/2" x 6 1/4". 10 lbs.

ORDER DIRECT BY MAIL OR SEE YOUR HEATHKIT DEALER*

*The convenience of Local Heathkit Sales and Service costs but a few dollars more.

HEATH COMPANY

a subsidiary of
DAYSTROM, INCORPORATED

Benton Harbor 8, Michigan

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only. Dealer and export prices slightly higher.



FREE CATALOG!

Describes over 150 easy-to-build electronic kits in HI-FI, Test, Marine, and Ham radio fields. To get yours, fill in this coupon and mail today!

NAME _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

ITEM	MODEL	PRICE

AN APPEAL TO INTELLIGENCE

A product that is consistently advertised in QST month after month, year after year, has to be good. Over 10,000 GOTHAM antennas have been purchased by QST readers. Even the "price-is-no-object" customers choose GOTHAM antennas on the basis of performance and value. Select your needs from this list of 50 antennas:

Airmail Order Today—We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TWO BANDER BEAMS

A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. *Proven Gotham Value!*

6-10 TWO BANDER	<input type="checkbox"/>	\$29.95
10-15 TWO BANDER	<input type="checkbox"/>	\$34.95
15-20 TWO BANDER	<input type="checkbox"/>	\$36.95
15-20 TWO BANDER	<input type="checkbox"/>	\$38.95

TRIBANDER

Do not confuse these full-size Tribander beams with so-called midgers. The Tribander has individually fed (52 or 72 ohm coax) elements and is broad banded. It does not have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

<input type="checkbox"/> 6-10-15	\$39.95	<input type="checkbox"/> 10-15-20	\$49.95
----------------------------------	---------	-----------------------------------	---------

2 METER BEAMS

Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

<input type="checkbox"/> Deluxe 6-Element	9.95	<input type="checkbox"/> 12-El	16.95
---	------	--------------------------------	-------

6 METER BEAMS

New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

<input type="checkbox"/> Std. 3-El Gamma match	12.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 3-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Std. 4-El Gamma match	16.95	<input type="checkbox"/> T match	19.95
<input type="checkbox"/> Deluxe 4-El Gamma match	25.95	<input type="checkbox"/> T match	28.95

10 METER BEAMS

Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

<input type="checkbox"/> Std. 2-El Gamma match	11.95	<input type="checkbox"/> T match	14.95
<input type="checkbox"/> Deluxe 2-El Gamma match	18.95	<input type="checkbox"/> T match	21.95
<input type="checkbox"/> Std. 3-El Gamma match	16.95	<input type="checkbox"/> T match	18.95
<input type="checkbox"/> Deluxe 3-El Gamma match	22.95	<input type="checkbox"/> T match	25.95
<input type="checkbox"/> Std. 4-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Deluxe 4-El Gamma match	27.95	<input type="checkbox"/> T match	30.95

CITIZENS BAND ANTENNAS • Any of our ten meter beams or the V40 vertical is perfect for the CB operator.

FREE GIANT 1960 CATALOG

Name
Address
City Zone State

New! Ruggedized 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- ☐ Beam #R6 (6 Meters, 4-El) ... \$38.95
- ☐ Beam #R10 (10 Meters, 4-El) ... 40.95
- ☐ Beam #R15 (15 Meters, 3-El) ... 49.95



15 METER BEAMS

Fifteen meters is the "sleeper" band. Don't be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

<input type="checkbox"/> Std. 2-El Gamma match	19.95	<input type="checkbox"/> T match	22.95
<input type="checkbox"/> Deluxe 2-El Gamma match	29.95	<input type="checkbox"/> T match	32.95
<input type="checkbox"/> Std. 3-El Gamma match	26.95	<input type="checkbox"/> T match	29.95
<input type="checkbox"/> Deluxe 3-El Gamma match	36.95	<input type="checkbox"/> T match	39.95

20 METER BEAMS

A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

<input type="checkbox"/> Std. 2-El Gamma match	21.95	<input type="checkbox"/> T match	24.95
<input type="checkbox"/> Deluxe 2-El Gamma match	31.95	<input type="checkbox"/> T match	34.95
<input type="checkbox"/> Std. 3-El Gamma match	34.95	<input type="checkbox"/> T match	37.95
<input type="checkbox"/> Deluxe 3-El Gamma match	46.95	<input type="checkbox"/> T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a \$16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-TI2TG)

FACTS ON THE GOTHAM

V-80 VERTICAL ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Withstands 75 mph wind-storms.
- Non-corrosive aluminum used exclusively.
- Omnidirectional radiation.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price. **ONLY \$16.95.**

73
GOTHAM



YOU COULD
WORK
WONDERS WITH
A
GOTHAM
VERTICAL
ANTENNA!

FILL IN AND SEND TODAY!

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST

1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS. ESPECIALLY SUITED FOR THE NOVICE WHO OPERATES 40 AND 15..... \$14.95

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS... \$16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... \$18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

City.....Zone.....State.....



**FIELD
ENGINEERING
WITH
A
BRIGHT FUTURE
IN
RAYTHEON'S
SONAR SYSTEMS
PROGRAMS**

■ Some of the newest and most challenging field engineering programs are under way at Raytheon in the sonar field. ■ Just completed was a seven week technical evaluation trip in Bermuda waters where the newest underwater communications system developed by Raytheon was tested. These tests proved very successful. ■ Among the Raytheon field engineering group assisting on this trip aboard the submarines were three "Radio Hams". They were A. C. 'Doc' Aulwurm, K1LXZ; Claude Stogsdill, K1NXS; and Milton Levy, K1KIT, shown in photo above in conference with Ed Dodge, W1CMU. ■ Ham radio electronic experience has helped many engineers advance within the Company. ■ You may qualify as a Raytheon field engineer if you have previous experience plus an E.E. degree or the equivalent in practical experience with guided missiles, fire control, ground and bombing radar or sonar. ■ Benefits include attractive salary, assistance in relocating, insurance, and the opportunity of participating in educational programs. For details, please contact Ronald Guittarr.

Electronic Services Division
Raytheon Company
2nd & South Avenues,
Northwest Industrial Park
Burlington, Massachusetts



COMMUNICATOR IV...

Blue-chip Investment.

Many of the thousands of Communicators on the air today were purchased a number of years ago. A substantial number of these units have changed hands several times over the years. Basically well designed and constructed, they continue to perform . . . retain their resale value. Any Communicator owner can find a good market for his old gear whenever he decides to step-up to a newer, more advanced model. And COMMUNICATOR IV gives any VHF man the best of reasons for taking this step . . . today.

Now . . . higher input power . . . greater "Talk" power. A fine modern-design receiver using the latest VHF frame-grid, front-end tubes for a noise figure of 4-5! Triple conversion with first conversion quartz crystal controlled . . . your assurance of high stability of the frequency range where stabilization is most important—and usually most difficult to obtain. Receiver is continuously tunable, 143.7-148.3 mcs.

Add other "dividend" features: adjustable "squench", noise limiter, "S" meter, earphone jack, 6-switchable crystal positions plus provisions for external VFO . . . transistorized universal power supply built-in, no strapping—merely use proper plug/cable supplied to change from AC to DC.

All-in-all, features for greater range and flexibility . . . for a new high order of operating pleasure and convenience. From any viewpoint . . . a blue-chip investment. **369.50**

OTHER MODELS:

COMMUNICATOR IV
IS CERTIFIED FOR
OCOM SPECS WHEN
SUPPLIED WITH
#3361 C-D KIT.

COMMUNICATOR IV
MODELS FOR CAP



SOON . . . COMMUNICATOR IV MODELS
FOR 50 MCS AND FOR 220 MCS.



GONSET

Division of Young Spring & Wire Corporation
801 SOUTH MAIN ST., BURBANK, CALIFORNIA

EXPORT SALES: WESTREX CORP., 540 WEST 58TH STREET, NEW YORK 19, N.Y.



DESIGN

STRENGTH

DEPENDABILITY

THREE REASONS WHY
YOUR BEST BUY IS...

E-Z WAY Satellite "60"

E-Z WAY AERO-DYNAMIC design decreases wind load and provides telescoping action that permits raising and lowering of tower sections. CRANK UP TO 60 FEET, DOWN TO 25 FEET and TILTS OVER FOR ACCESS TO ROTOR OR BEAM.

STRENGTH is built-in to every E-Z Way Tower...Heavy wall steel tubing legs, continuous diagonal bracing of solid steel rod and electrically welded throughout...no loose bolts or nuts here. E-Z Way design and strength are your assurance of DEPENDABILITY that you can count on year after year. See your nearest distributor today or write for free literature.

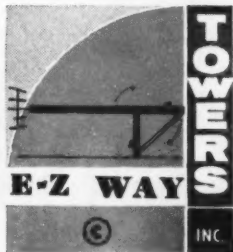
The SATELLITE

Model RBX-60-3P (Painted) \$335.00
Model RBX-60-3G (Galvanized) \$410.00

MOUNTING KITS:

GPK X60-3 (Ground Post) \$125.00
BAK X (Wall Bracket) \$17.00

Freight Prepaid anywhere in (48) U.S.A.



P.O. BOX 5767 TAMPA 5, FLORIDA

108

Station Activities

(Continued from page 94)

ney ARC held its Annual Picnic at the QTH of K2MQA with an attendance of 55. The Auburn ARA elected W2TCU, pres.; W2YAD, vice-pres.; W2QHQ secy.; and K2JVI, treas. W2PVI compliments K2VOX for NCS duties on ECEN. W2QCI reports that 20.2 Mc. is monitored evenings in the Lockport-Albion-Rochester Area. The Buffalo Area Telephone Co. employees (TEARA) contact K2CD or K2PVN for the fall schedule. K2CWD got a degree in elec. tech. from Broome Tech. College. Broome County amateurs are using the AREC organization to supply communications for sports car rallies and soaring meets. A group headed by K2QKX gave valuable assistance to the police in Johnson City. W2GCH reports there was a large turnout to hear W3YA, Atlantic Division Director, speak on the ARRL North Country amateurs are really becoming active, largely through the organizational efforts of W2GCH with the North Country Call Book and CVARC Ham Bulletin. There has been discussion concerning the suitability of our section name. "Western New York" doesn't seem too descriptive when you consider that it encompasses the Adirondack Region, St. Lawrence, Champlain Valley and the Southern Tier. I would be interested in hearing ideas on the subject. How about "New York State Section"? There are over 4000 hams in our section, more than 100 organizations that I know of and many nets. We have 44 Emergency Coordinators and in most cases they also are Radio Officers in their respective counties, resulting in the RACES and AREC organizations working together for maximum efficiency. If you have a RACES or AREC problem, W2LXE or I will be glad to help. Traffic: W2EZB 726, K2SSX 405, K2RVF 150, K2QDT 141, W2OE 119, K2IYP 113, W2ALO 80, K2OFU 78, W2FEB 74, W2CRH 62, K2RTQ 61, K2DXV 55, K2QKX 33, K2RWV 33, K2TDG 33, W2RYH 23, W2DSC 22, W2IZK 15, K2BBJ 13, K2EE 13, K2GKK 11, W2HEC 11, W2TPV 7, W2PGA 4, W2PVI 2, K2RTE 2.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC, OMA, RMs: K'UN, NUG and GEG. The WPA Traffic Net meets Mon. through Fri. at 1900 EST on 3585 kc. The PFN meets Mon. through Fri. at 1800 EST on 3850 kc. Newly elected officers of the ATA of WPA are: UGV, pres.; NUG, vice-pres.; ZJZ, secy.; UL, treas.; KQF, LTH and EOU, directors. LXQ is fishing in Canada. GEG is installing radio gear in the Belgian Congo. WRC is teaching classes on using a resusitator. The following members of the Nittany ARC passed the General Class exam: K3AKR, HCN, K3LUT, K3LUX, K3LVB and SYV. The Greater Pittsburgh V.H.F. Society reports that JEO has a new HQ-180; GCH has his General class license; winners of the local ground-wave contest were BWU, GQA and ERK, in that order; UAK is Greenland bound. The Horseshoe RC reports via *Hamateur News*: K3IGA attended the Scout Jamboree in Colorado; K3GRU has a Johnson Valiant; TXQ has 186 countries worked with 179 confirmed; AUD mobilized on 6 meters to Utah and back. The Steel City ARC reports via *Kilowatt Harmonics* that OKU has been appointed asst. chief eng. of KQV; MJC is constructing a 2-meter rig; SVJ was elected club trustee; KWH now is on 220 Mc. The Etna RC reports via *Oscillator* that the club was host to the RACES of Sector I, with OMA giving a progress report; OVM, TAS and TVW have gone mobile; new officers of the Breezeshooters are FSF, pres.; OPF, secy.; treas.; TWV, checker; SHT, YPH and K3COT, wind gaugers. The Cumberland Valley ARC reports via *Valley QRM* that Field Day in Franklin County was a success; K3JJK is moving to W2-Land. The Washington County ARC reports the following new officers: YDG, pres.; UEN, vice-pres.; WJF, secy.; K3DXV, treas.; IDO, act. mgr. The Coke Center RC Novice code and theory classes are showing good progress at the c.d. center. Traffic: W3WRE 226, K3GHH 108, W3KUN 52, LSS 51, MFB 19, K3HWL 15, W3UGV 10, K3COT 3.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, 9GME. SEC: PSP, RM: USR, PAM: RYU. EC of Cook County: HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. By now most of the annual hamfests are over and it was a pleasure getting out into the field and meeting the gang again. EU was honored by the Governor and appointed to the Development Council of the State of Illinois. MCE is DXing with a new HT-37 and in the off hours his XYL, KMD, is ragchewing on the local nets. HB finally is on s.s.b. Traffic for nets follows: ILN 141, North Central Phone Net 217. GDI is using a new quad made of fiber glass. QPJ is now on 2 meters. SXL, EC

(Continued on page 110)

on
the
air
tonight



HAMMARLUND HX-500 TRANSMITTER

Tonight, and every night to come, more and more Hammarlund HX-500 SSB transmitters will be operating and serving as the topic of conversation. This new transmitter is rapidly setting the standards by which all other transmitters will be judged.

Loaded with new features, designed to provide the finest performance, and built to the fine traditions of Hammarlund craftsmanship, the HX-500 is your best buy in the fine transmitter field...

Write today for complete details... **\$695⁰⁰** amateur net.



Established 1910

HAMMARLUND

A DIVISION OF
TELECHROME

HAMMARLUND MANUFACTURING COMPANY, INC., 460 W. 34th ST., N. Y. 1, N. Y.

Export: Rocke International, 13 E. 40th St., N. Y. 18, N. Y. Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

LW-51 DELUXE 6m Transmitter

RF OUT — 0 50 100% Mod.

ACTUAL SIZE OF METER SCALE WHICH
READS % MODULATION AND R.F. OUTPUT



COMING SOON!

What Many Of You Fellows
Have Been Waiting For . . .

2-METER LW-51 DELUXE

WRITE FOR
LATEST INFORMATION!

**PA ELECTRONIC
LABORATORY**
ROUTE 2, JACKSON, MICHIGAN

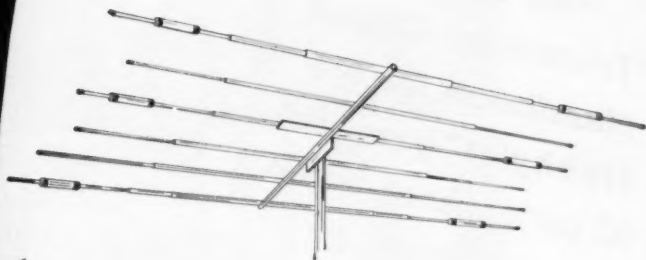
of McLean County, reports that the CIRC (Bloomington) c.d. has its portable equipment ready to roll. LU6MR visited ERU on his visit to Rockford. The Sangamon County and Springfield C.D. Weather Net is progressing satisfactorily, according to SVO, net control officer. New Novices heard in Hoopston are a father and son, KN9ZKA and KN9ZJY. The Chicago RACES is operated with the Classic Car Club and provided communications on a field trip to Mendota with FBF, INF, QRE, STQ and STR providing the handle-tail code. We extend our sympathy to the family of KX, who recently passed away. LGH is now working for the FCC in Chicago and one of his duties is giving amateur radio license examinations. K9ITM is back on the air after completing his 4-year stint at the University of Illinois with a new QTH. OQN has been appointed Radio Officer for Olympia Fields C.D. A new Novice heard was KN9YOI, in Decatur. Our congratulations to Asst. SCM GME and her OM on their 20th wedding anniversary. She will edit future publications of the *Queens Key*, official bulletin of the Chicago YLRL. K9YHU is Radio Officer and K9VJP is c.d. captain of the newly-organized Woodriver RACES. Members of the Madison and Tri-County Storm Warning Net visited the Lambert Field weather station to survey weather radar equipment with which the local net is linked on 2, 6 and 10 meters. K9BHD is rebuilding his RTTY shack with a new complete diversity installation. K9MHF, UYP, K9KKL and LOK are new 4-1000 HB linear amplifier owners. KN9ZAF, KN9ZAD, KN9ZBV, KN9WQE and KN9ZCI are new Chicago Area licensees. MEZ is recovering from a serious illness. KMN has a new Apache and an SB-10 adapter. New appointees are K9QVA and BS. K9JTD and K9IVG as OOs. LDA is the only BPL winner. Traffic: (July) W9IDA 1144, DO 364, USR 358, JXV 240, K9UGY 128, QYW 103, RHU 74, W9MAK 72, FAW 63, K9MHV 63, RAS 58, IVG/9 46, W9SXL 38, K9KGO 37, LXG 21, W9GFF 12, K9BIV 10, IUM 10, W9PRN 10, K9JMA 6, OCU 6, QFO 6, W9SKR 6, K9MLI 4, UCR 3, QMJ 2, VQA 2. (June) K9QDA 1.

INDIANA—SCM, Clifford M. Singer, W9SWD—Asst. SCM: Arthur G. Evans, 9TQC. SEC: SNQ. PAMS: K9AOM, BKJ, RVM and UKX. RMs: DGA, JOZ, TT and VAY. Net skeds: IFN, 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.), 1900 daily on 3920 kc.; QIN, 1900 daily and RFN, 0700 Sun. on 3656 kc.; QIN (training), 1800 M-W-F on 3745 kc.; CAEN (160 meters), M-F at 1900 on 1805 kc. New appointments: K9HEL as EC for Floyd County, K9TJY as EC for Decatur County. MIO EDO as OBS and K9MAN as OPS. JOZ resigned July 29 as RM for QIN (training) after doing an FB job since its founding in Sept. '59. The new RM replacing him is FJR. Novices who would like to join the net may obtain a crystal from FJR for 3745 kc. for 25¢ deposit. Stations assisting with communications for the Sheridan Centennial Parade, all operating 6-meter mobile, were K9BEZ, K9IXD, K9LAQ, K9LBN, K9SER, K9SQD and HMK. A class of nine students at the Indiana Blind School studied code and theory under the direction of DNQ, assisted by JJC, PSE, APJ, K9EUQ and JZV. Four obtained Novice Class licenses. Classes will resume in the fall. K9GEL has a new HQ-170. K9UQC is a new call in Winslow. TWU has worked 4 states on 2-meter RTTY. K9IXD worked K9OYE in Kansas City, Mo., on 6-meter RTTY. The Wahash Valley ARA held another successful V.H.F. Hamfest at Turkey Run State Park. KN9ZQZ is a new call in Indianapolis. K9KFK, K9KFL, K9GCU and K9PPP, an all-ham family, received a royal welcome and enjoyed an FB visit at ARRL Headquarters. K9VCH is on 6 meters with an HB-6146 with a good signal. *Amateur radio exists as a hobby because of the service it renders.* July Net reports: VAY reports QIN traffic at 386, IFN totaled 361, as reported by RVM. K9AOM reports 199 for ISN. RFN netted 107, reports TT. QIN (training) and CAEN were not reported. Those making BPL: DGA, GJS, LIT/9 and TT. Traffic: (July) W9TT 617, ZYK 374, GJS 324, DGA 217, BDG 208, MM 160, K9CBB 158, W9LIT/9 153, NZZ 126, K9UBK 92, HMC 89, W9VYM 47, SWD 41, FJR 40, SNQ 41, K9AOM 38, BSU 35, W9RTH 28, QYQ 20, CC 18, K9MAN 18, RMI 15, TCG 15, W9IMU 13, BDP 12, BUQ 11, K9GSV 7, W9YYX 7, EJW 6, TQC 5, FWH 4, K9IXD 4, ELE 3, W9AB 2. (June) W9MM 158, K9MAN 54.

WISCONSIN—SCM, George Wolda, W9KQB—SEC: YQH. PAMS: NRP and NGT. RMs: VHP and VIK. New appointees: K9MWQ as OES, NRP as OPS, ZB as ORS. The Waupaca Club elected K9MAS, pres.; CIZ, vice-pres.; ZDJ, secy.-treas.; K9LWV, act. mgr. With K9PDJ moving to Ohio, our section has lost one of its better traffic operators. A kw. is in the making at YT as per SZR, who is trafficking mobile. The first issue of DYG's *CAN Bulletin* was well received by members of that net. K9GDF has an 80-meter DX record of 12 miles with his self-contained, 1½-pound 35-mw. 3Q5 rig. The 2-meter portable stations project of the Osh-

(Continued on page 112)

NEW!



TA-36 by Mosley

for 10-15-20

The new clean-line design TA-36 . . . the three band beam that will give your signal that DX punch!

This wide spaced, six element configuration employs

4 Operating Elements on 10 Meters

3 Operating Elements on 15 Meters

3 Operating Elements on 20 Meters

Automatic bandswitching is accomplished by means of exclusive design high impedance, parallel resonant "trap circuits". Built for operation at maximum legal amateur power. Low SWR with high gain and front-to-back ratio. Traps are weather and dirt proof offering frequency stability under all weather conditions.

All heavy wall 6061-T6 aluminum - the finest aluminum alloy for antenna construction! Boom measures 2" OD by 24" by 1/8" wall, elements measure 1 1/8" to 5/8" in diameter with center sections of double thickness aluminum to reduce sag . . . fully rust and corrosion proof - Guaranteed!

Before you buy any beam - Check Construction Features!

See your nearest amateur equipment dealer or write for literature describing the TA-36 . . . the newest member of the Mosley TrapMaster family of fine amateur antennas.

Amateur Net \$129.50

Mosley Electronics, Inc. 4610 N. LINDBERGH BLVD.
BRIDGETON, MISSOURI

WEST COAST BRANCH
1406-08 South Grand Avenue
Los Angeles 15, California

INTERNATIONAL DIVISION
15 Moore Street
New York 4, New York

New Sylvania
**"Transistor Circuit
 Handbook for the
 Hobbyist"** gives you
 30 performance-tested
 circuits using
 low-cost transistors!



Interesting new "gadgets" and useful equipment for every electronic experimenter, "ham" or student. Handbook is divided into four circuit-packed chapters.

- I Test Equipment Circuits
- II High Frequency Circuits
- III Audio Frequency Circuits
- IV Utility Circuits

**NOW AT YOUR LOCAL
 SYLVANIA SEMICONDUCTOR
 DISTRIBUTOR'S. Only 50¢.**

Mail Orders accepted only from U.S.A.

Get a copy today!

Sylvania Semiconductor Division, Woburn, Mass.

SYLVANIA

Subsidiary of GENERAL TELEPHONE & ELECTRONICS

kosh Club is progressing successfully. Formerly of Oconomowoc, ZB is back in Milwaukee after 4 years as K4BI in Florida and has taken to active traffic-handling. NRP has turned over the management of the BEN to NGT. A job well done. Sid, and to Sherm, much success. From Green Bay, K9FTL is taking traffic for home from out-of-staters applying for fishing licenses. GFL is busy installing citizen band and two-way radio systems. K9ALP is with the USNR on the West Coast. K9GOZ now is attending classes at Milw. School of Eng., and K9ELT enrolled in a commerce course at U. of Wis. The Milwaukee Club's mobile wing held its meeting in IZO's rathskeller to coordinate its emergency activities. K9PZJ completed his 100th consecutive check-in at the Breakfast Club Net. At 9 states worked on 432 Mc., GAB is looking for schedules. The LaCrosse Club received its new call, PJ. The Wisconsin Slow-Speed Net (WSSN) on 3535 kc. at 1930 CDST is in need of more outlets. This is a good way to keep up your c.w. Traffic: (July) W9DYG 610, CXY 282, K9GDF 210, W9KQB 104, W2MTA 9 78, K9PDJ 68, DTK 67, W8SAA 53, VHP 50, NRP 46, K9JQA 26, W8SZR 22, LFK 10, CHE 18, YIK 18, ZB 18, APB 10, K9JOL 9, EJT 8, W0CCO 7, FZC 7, K9GSC 7, LWV 6, W0MWQ 5, K9ESN 4, CJL 2, LCA 1. (June) K9GYQ 141, W9CBE 31, K9DAF 21, GSC 15, W9LFK 14, ONT 6.

DAKOTA DIVISION

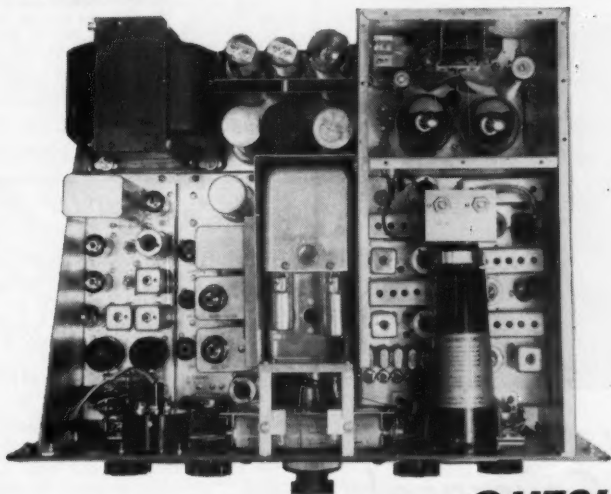
NORTH DAKOTA—SCM, Harold Wengel, W0HVA—SEC: K0KBV, PAM: K0KJR, RM: KTZ. The Minot Hamfest was well attended with 186 licensed hams present. Speakers included ARRL president TSN; Dakota Division Director, BUO; Perry Williams, W1UED, who gave a report on the Geneva Conference; Major Rexford and 30H, who spoke on MARS; and a captain from the Minot Air Base, K0ZPA, who spoke on Air Base Communications. The North Dakota Amateur Radio Assn. was organized with GNS, pres.; K0GRM, vice-pres.; QNW, secy.-treas.; RGT, KTZ, DNJ and NAD, directors. Late net report for June: GRM reports 4 sessions, total check-ins 77, formal traffic 10. CAQ spent a month at Lake Lizzie in Minnesota. Traffic: K0ITP 92, MPH 19, ADI 12, RLF 10, KJR 9, W0PHC 8, K0GGI 7, AZX 2, W0HBT 2, CAQ 2, K0GRM 2, PVH 2.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN. SEC: SCT. Ex-9MMY, of Menomonie, Wis., is president of the Farmers and Merchants Bank, Watertown, and is newly licensed as AFF, YQR, Black Hawk, is home after hospitalization for a heart attack. ADJ has moved from Rapid City to Meade County. New members of the Mitchell ARC are K0ALR and K0BMD. The Mitchell Club has moved its quarters to the new City Hall. GCP has a new HT-32. He received his 2nd-class commercial phone license while on vacation. K0YNS has moved to Huron. EGI, formerly of Lemars, Iowa, is working for K1JV in Huron. K0WDX, Huron, who recently dropped the "N", is putting together a Valiant kit. The Huron ARC has postponed its picnic and auction until next spring. K0WEM and K0WEN visited their son, WA2GWT, in New Jersey and brought back an HT-32, a Courier and a t.r. switch. New Technicians are K0YNR and K0YWP, Sioux Falls. The South Dakota Noon Net has moved to 3870 kc. at 1215 CST. K0ZMA has WAS, HON moved to Denver to accept a position with Martin. A new licensee in Sioux Falls is K0CLT. Traffic: W0SCT 325, K0BMQ 174, W0DVB 75, ZWL 28, K0DUR 8, ACJ 4, PDW 4, RQY 4, W0YVF 4, K0AIE 3, W0OPF 3, K0VIZ 3, VYY 3, DHA 2, W0RSP 1. (June) K0ACJ 13.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, W0KJZ—Asst. SCM: Rollie O. Hall, 0LST. SEC: TUS. Asst. SEC: K0EWC. PAMs: OPX and K0EPT. RMs: RIQ and K0LZD. MARC members BUO, dir.; K0EPT, PAM; and your SCM had the pleasure of meeting and hearing ARRL Assistant Secretary Perry Williams, W1UED, speak in Mankato. Two hundred attended the MARC Picnic, and eighty the SPRC's. K0JYC and EWC passed the 1st-class commercial exams. EC MXC, chairman of the TVI committee, stated that the Minneapolis Club received a letter of commendation from the FCC Field Engineer for outstanding work in handling TVI complaints. AGL and his XYI are back from a two-month European tour. OES K0DPO spent three weeks in Alaska. K0BLJ is a newly-licensed YL in Minneapolis. The Ground Wave editor received the call K0CWZ. K7GPW, of Montana, is a Minneapolis resident now. BBY can be heard on RTTY. K0QBB, QBE and QBJ are active on 6 meters. NWA Pilot RAZ is planning a DX-pedition to the British Virgin Islands in February. EC K0MEQ's home was damaged during the Jordan flood. K0OQT handles overseas phone traffic. EC K0QLM joined AF MARS. OO WMA runs a kw. and a pair of 818s on s.s.b. K0AKM wired a Vik-

(Continued on page 114)

INSIDE . . .



OUTSIDE . .



OR ON THE AIR . . .
THERE'S NOTHING FINER THAN A 100V
Price . . . \$795

OTHER FINE MULTIPHASE GEAR

20A 10B 600L MM-2 GC-1 Model A & B Slicer

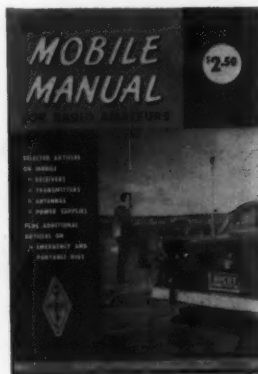
For further information, write for the new four page 100V brochure.

MULTIPHASE

EQUIPMENT

Central Electronics, Inc.
1247 W. Belmont Ave. Chicago 13, Illinois
A subsidiary of Zenith Radio Corp.

WRITE FOR
LITERATURE ON
THE COMPLETE
MULTIPHASE LINE



New Coverage!

A new and extensively revised edition of The Mobile Manual for Radio Amateurs is now available. In addition to a wealth of new mobile material the Manual now includes numerous articles on Emergency and Portable gear, thus making it useful not only to mobileers but to all amateurs interested in lightweight, compact gear designed for field and emergency operation.

The Mobile Manual assembles under one cover the most noteworthy articles on mobile and portable operation that have appeared in past issues of QST. It includes articles on construction of receiving converters, transmitters, antennas, power supplies and suppression of noise in vehicles; contains excerpts from FCC regulations governing portable and mobile operation. A valuable "how to do it" manual for all amateurs.

\$2.50 U.S.A. Proper
\$3.00 Elsewhere

**American Radio
Relay League, Inc.**

WEST HARTFORD 7, CONNECTICUT

ing Adventurer and uses an NC-46 receiver. K0WYV received his General Class license and is a new MJN member. CO and his XYL are touring in Europe. Congrats to TUS and K0ORK on making the BPL. A total of fifteen violations were listed by OOs WMA, KLG, WAS and K0JCF. Thirteen-year-old KN0CIB uses a Globe Chief transmitter. K0GJZ was transferred to New York. EC FGP had more eye surgery. EC K0KKQ renewed his appointment. Our AREC membership stands at 581 now, and our section ranks fifth among the 72 active ARRL sections. Congrats to K0UOV on receiving her General Class ticket. K0IKU operated portable in Hubbard County for WAM. K5SNC was top scorer in the last CD Party. Last of the W and K zero calls, KN0ZZZ, was issued recently to Charles Ginn, Minneapolis. Traffic: (July) W0TUS 1004, K0ORK 432, QBI 107, SNC 102, W0HEN 100, LST 95, PET 93, OPX 83, K0PML 83, W0KYG 73, K0UKU 73, W0KLG 69, K0LWK 59, W0RIQ 56, WMA 33, BUO 47, K0EPT 40, JYJ 40, JCF 35, MGT 34, W0ISJ 32, KJZ 32, DQL 30, VXX 26, K0QYV 23, IZD 21, SBB 21, OQT 17, SNG 17, W0THY 17, UMY 17, K0HIW 15, IKU 15, RHN 12, W0FGP 8, K0MAH 6, W0VPO 6, K0VPP 5, W0OET 4, SZJ 4, KN0ZMH 3, W0UCV 2, WVT 2, K0WYV 2. (June) K0EPT 47, IZD 35, W0ISJ 29, K0QLM 11, W0WAS 10, MXC 8, K0OQT 2. (Apr.) W0WMA 57.

DELTA DIVISION

ARKANSAS—SCM, Ulmon M. Goings, W5ZZY—SEC: K5CIR, PAM: DYL, RM: K5TYW. HFQ has been operating at reduced power for the past few months because of illness. We hope Harry soon will be up and back in his shack with his rig. (He has had a rig in his sick room.) We notice that DZK has a new tri-band beam erected atop the shack. SZJ has a new v.f.o. The hams in the Arkansas section were very sorry to have K5HOL leave us for Ocala, Fla., where he now lives and soon will be using a 4 call. ZZY has just returned from a vacation in W6-Land. GWB has been visiting hams in Alabama. With the fall season now before us, let us encourage you all to renew your efforts in the AREC and the various traffic nets in the section. Our congratulations to John Merideth on receiving his Extra Class ticket. Traffic: K5GXR 104, IPS 48, W5SZJ 44, K5TYW 12.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—MXQ found the shorted condenser that was plaguing him and keeping him off the air so he is going strong again. There will be a new AREC Net in operation each evening at 9:30 p.m. CST in the New Orleans Area soon. K5AGJ is home from the hospital after a pretty bad heart attack, but judging from his traffic report I would say that he is fully recovered. LAN activity is continuing through the summer. Most of the regulars are the new hams. Among those reporting were MXQ, CEZ, PXV, WMU, K5OKR, K5UYL, K5IGW, K5LZA, K5TTA and K5MNP. The Dixie Early Bird Net had a reunion and barbeque with 33 attending at Gulfport. The Lake Charles Club has its station, QEQ, at Scout Camp in Edgewood handling traffic from the scouts to their families. K5LZA, who recently moved from Texas to Louisiana, is now active in the Crowley Area. However, will go back to Texas A&M when school reconvenes. The Westside ARC held its annual banquet and election of officers and awarded certificates and otherwise honored its members who have worked hard for the club. The new officers are K5KEP, pres.; K5UNP, vice-pres.; ERR, secy.; INL, treas.; BUK, act. mgr. The most valuable member award, a bronze plaque, was awarded to BUK. The Novice of the Year Award went to KN5BME. Your SCM was glad to be invited to this fine annual affair. Incidentally, BUK just made WAZ. The teachers were K5URU, K5VAV and W5KSL. The results were K5CRW, CRT, DGQ, DZJ, DPM, DKF and DGQ. Classes are held each Fri. 7-9 p.m. The newest old-timer to come back on the air is NZ. Traffic: W5CEZ 277, K5LZA 196, AGJ 183, W5MXQ 36, K5CVZ 18, ARH 17, W4DLM/5 12, W5EA 9, NUH 8.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—K5WOW and K5WOX have moved to Yazoo City from Ozona, Tex. Welcome to Mississippi, fellows. K5EYS is on the air from Decatur. The JARC held its annual hamfest at Legion Lake. There was a fine gathering with good prizes. The s.s.b. supper was well attended, also. Congratulations on a fine program, fellows. K5QNF has been appointed SEC for Mississippi. Anyone desiring to take part in emergency activity, contact either Ed or myself. New appointees for Mississippi are ACS and K5IUE as ECs and K5QNF as CO. Now that fall is here I'll be looking forward to meetings with the many clubs throughout the section. Please contact me for meeting dates.

TENNESSEE—SCM, R. W. Ingraham, W4UIO—
(Continued on page 116)

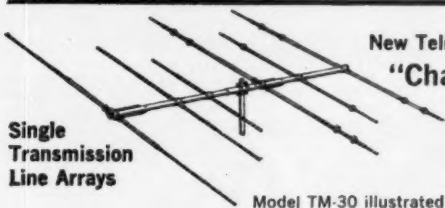
ANTENNAS
SINCE
1921

telrex LABORATORIES

Communication and TV Antennas

ASBURY PARK 25, NEW JERSEY, U.S.A.

DESIGNERS AND MANUFACTURERS OF COMMERCIAL SERVICE "BEAMED-POWER" ARRAYS



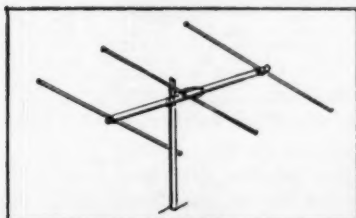
Single
Transmission
Line Arrays

New Telrex "Challenger"

Model TC-88
"Tri-Band"
\$99.75

Model TM-30 illustrated

26 pounds of educated aluminum—Telrex "Tri-Band" is World Renowned for performance, excellence and value.

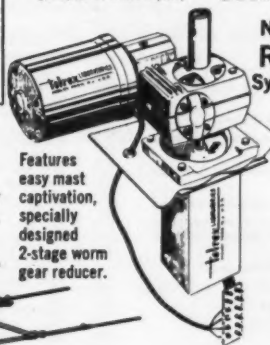


Model 2M-3C \$6.95

2 Meter Arrays

Telrex offers 12 models in the 2-meter band. Prices range from \$6.95 to \$115.00.

Model TC-99	\$159.50
Model TM-30	\$329.00
Model DP-3	\$38.50
(10-15-20 Meter Dipole)	
Model DP-4	\$175.00
(10-15-20-40 Meter Dipole)	



Features easy mast captivation, specially designed 2-stage worm gear reducer.

2, 6, 10, Citizens Band, 15 and 20 meter Ground Plane

The very best money can buy!

Antennas

MODEL
GP-2M

\$7.25



Unity gain, broad-band ground-plane omni-directional pattern antennas.

New Telrex ROTATOR/INDICATOR System Model 175-RIS \$198.50

Designed to out-perform and outlast any other beam rotator in its class. Will hold and rotate beams in winds up to 110 mph. Control Housing is Telrex quality thru-out. Black japanned aluminum housing. Tri-colored azimuth rose and reciprocal readings. Has sel-syn indication and limit of rotation circuitry.



Also available—Extra Heavy Duty Rotator Models

New Telrex "CHRISTMAS TREE" 3-Band System

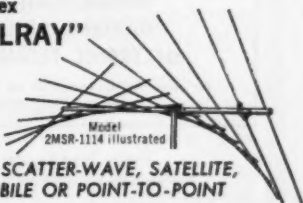
By far the most powerful and practical 3-element "Tri-band" System... guaranteeing no compromise, 3-band performance and reliability—rain or shine! "Balun" feed and optimum antenna design assures... maximum gain, and impedance bandwidth, plus pattern symmetry with minimum TVI, BCI and harmonic radiation qualities not possible with so-called "Tri-banders".



World's Finest, Most Practical Communication System Featuring "Beamed-Power" and "Balanced-Pattern"

New Telrex "SPIRALRAY"

\$19.50



Model 2MSR-1114 illustrated
FOR SCATTER-WAVE, SATELLITE, MOBILE OR POINT-TO-POINT

Extremely high-gain, high signal-to-noise, practically no fade, all radiation planes—horizontal, vertical or oblique! 50, 108 and 144 megacycle models available.

All prices FOB Asbury Park, New Jersey, subject to change without notice

FIELD STATION ENGINEERS

Several qualified engineers will be selected to join in a program which is advancing the state-of-the-art of

IONOSPHERIC PHYSICS

and the study of

BACKSCATTER PHENOMENA

Background in these areas will be developed through a training program in our Electro-Physics Laboratories, located in Bladensburg, Maryland. Engineers selected will become part of a team extending experiments of the Research and Development Department to the field, in both Domestic and Overseas assignments, and will have ample opportunity to develop technically.

They will possess a combination of the following requirements:

- ✓ BSEE, or equivalent consisting of combined civilian or military technical school plus work experience.
- ✓ Presently employed as a Field Engineer or Project Engineer.
- ✓ A good command of some of the following:
 - RADAR, preferably High-Power
 - HF Long-Distance Communications Systems
 - Tropospheric or Ionospheric Scatter Systems
 - Meteor-Burst Communications Systems
 - Propagation Prediction—computation of propagation for long-distance communications
 - Ionospheric Sounder Operations
 - RDF Systems
 - Doppler RADAR Systems
 - Amateur Radio Enthusiast
- ✓ FCC License, 1st or 2nd Class.

Applications Are Also Being Accepted For

SENIOR SCIENTISTS ENGINEERS (All Levels) ELECTRONIC TECHNICIANS

for permanent assignment at our Electro-Physics Laboratories in Bladensburg, Md.

Please Send Resume To:
Professional Employment Department

**ACF ELECTRONICS DIVISION
ACF INDUSTRIES**

INCORPORATED

RIVERDALE, MARYLAND

SEC: K4EJN. PAMs: PAH and UOT. RM: FX. BPL awards for July traffic went to PL and K4s AKP and FNR. WBK reports that the MARA amateur radio school had an average attendance of 90 and that most met requirements for an amateur license. K4AMC says he is looking forward to a full season of traffic. TDZ says that he, LNB and K4KTC have 432-Mc. antennas. New appointees are K4AKP and K4BWS as ORSs. Renewals are FX as RM and JYM as EC and OPS. Reports received: Net, FX and PAH; OES, K4KYL; OO, TDZ and K4RIN. Traffic: W4PL 1292, K4AKP 1032, BWS 219, W4EIN 125, K4FNR 121, W4VJ 37, K4OUK 60, W4FX 54, PGP 43, UIO 18, K4AMC 8, W4UUL 8, TYV 6, K4KYL 4, W4PAH 3.

GREAT LAKES DIVISION

KENTUCKY—SCM, Robert A. Thomason, W4SUD—Asst. SCM: W. C. Alcock, 4CDA, V.H.F. PAM: K4LOA. PAMs: K4EICK and S2B. RM: K4C5H. K4AQDF has the Tri-State Novice Net in operation and is looking for more active stations. Cumberland County purchased a 3-kw. power plant and issued it to the e.d. communications officer and PAM S2B. YVI is out of the hospital and doing fine. K4LRX reports that a storm wrecked all his antennas. He will be back on soon with a 60-ft. tower and beam. K4N4WJ received his ticket at Maysville. HTD is glad to be back on KYN after a rough school term. K4HTO is building an a.s.b. rig to take back to M.I.T. this fall. K4VDN is keeping KYN-9RN liaison. K4ZRA worked 44 countries in 1½ months of operation. K4MSV and K4MPV plan to operate portable VE3 on a fishing trip. OO K4ZQR has a new LM frequency meter. Everyone reporting on the Louisville Hamfest says it was a big success. K4KWE has a new Ranger. ADH reports excellent 50-Mc. openings July 12 and 13. K2LVQ/4 is new on KYN. OO reports were received from K4BUB, K4ZRA, K4IFB and K4ZQR. Traffic: K4VDN 102, W4BAZ 91, K4C5H 71, PGH 71, KWE 60, KWQ 59, W4HTD 49, CDA 31, K4JMU 30, VDO 27, W4SZB 23, K4SFD 21, DFO 18, FUM 16, W4SUD 15, K4ZRA 12, SBZ 10, W4ADH 8, K4ZBA 8, ZQR 7, W4VJV 4, WVU 4, K4YCB 3, W4KJP 2, K4SPJ 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: YAN. RMs: SCW, OCC, QQQ, FWQ. PAMs: AQA, K8CKD, K8JUG, ATB, V.H.F. PAMs: NOH and PT. EC appointments were issued to EMD and FZL. ORS to DSE, OPS to QBA, OBS to QBA, OO to K8CWI. PLP was killed in an auto accident while driving up to the QCWA picnic on Tahquamenon. His wife was badly injured when the car turned over near Hugin Lake. K8DJE, in the Navy, wants mail from BR netters. His address is Nathaniel Jones, SN, 5th Division, USS Saratoga, CVA 60, FPO, New York City. PHM made 25-w.p.m. CP. K8KIR is now in MARS. Since Sept. 1, '59, EMD (OO) has turned in 2036 "citations"! Ninety per cent ham operation in S.W. Michigan is now v.h.f. and we need OOs and has a General Class license. K8LZF is now on phone traffic. K8EWI has started his OO activities. ZHB is rebuilding the auto generator for 110-volt a.c. output. K8KCO has to drop OO and OBS activity because of moving. Cw. activity on 50 Mc. is increasing. Good OES reports were received from K8BGZ and K8HNQ. Traffic: (July) W8OCC 178, FWQ 120, FX 75, K8GJD 70, LZF 68, OTJ 59, W8NOH 54, JTG 52, NUL 41, ELW 39, K8JUG 38, KMO 38, NAW 37, W8RTN 23, SWF 21, CQU 19, K8DJQ 17, W8BTP 17, K8EWI 15, W8YAN 14, ZHB 14, AUD 10, ALG 9, K8GWZ 8, W8ET 7, HKT 5, DSE 4, EGI 2, K8KCO 1, LPV 1. (June) K8BOD 353, JUG 53, AEM 27, DJQ 25, EWI 19, KVV 16, W8QPO 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, 8DAE. SEC: HNP. RMs: DAE and VTP. PAMs: HZJ and WYS. K8VHG, the XYL of K8TOX, received her Tech. Class license, as did K8VKT, the XYL of K8OBW. GFE, one of Ohio's leading OOs for many years, joined Silent Keys. Toledo's Ham Shack Gossip tells us that K8CKS was named as its "Ham of the Month." Oregon City RC's officers are K8JQG, pres.; K8CCP, treas.; and K8HIG, secy. IZF has a new Seneca. The Bluffton ARC toured the RCA transistor plant in Findlay with 40 amateurs in the tour. HWX is now on 6 meters; the stork brought a baby girl to TXV. Springfield ARC's Q-5 states that K8HUY won the Bausch & Lomb Honorary Science Award and the stork brought KJP a baby boy. The

(Continued on page 118)

on your
desk top ...
or on wheels



GONSET G-76

6-band
100 watt AM
transceiver

Sparkling new...smooth-working combo...a powerful 100 watt AM transmitter, sensitive dual-conversion receiver...two-way operation on 80-40-20-15-10 and 6 meters. This handsome, designer-styled package is just slightly over one foot long, less than six inches high, mounts handily under the dash of your car—blends in too, belongs. Transistorized DC supply is separate, mounts in any small convenient space.

You can take this G-76 out of your car, use it—with matching AC power supply and speaker assembly—for excellent 6 band fixed station operation. Here's opportunity to add new enjoyment—and DX—with operation on another lively amateur band, 6 meters. G-76 is a full-blown, star performer on 6 as well as the other five widely used 10, 15, 20, 40 and 80 meter bands.

While G-76 is properly called a **transceiver** because of some common audio circuitry, transmitter and receiver are separately tunable. Receiver can be set to out-of-band DX, transmitter VFO anywhere within the band. Transmitter VFO is intended to be spotted on receiver dial. Frequency control may be either by VFO or quartz crystal. (Except on 6 meters which is crystal controlled only.) Transmitter and receiver oscillators are both compensated so that drift with temperature is negligible. Oscillator circuit has very low drift even with exceptionally wide excursions in both plate and filament supply voltages.

HIGHLIGHTS: Transmitter power input 100 watts AM, 120 watts CW • pi network output for 52 ohms • Dual conversion receiver • BFO for CW/SSB reception • Automatic noise limiter • Sensitivity: approx. 1 microvolt at 50 ohms for 6 db S+N/N ratio • Selectivity: 3 to 3.5 kc bandwidth at 6 db down, 14 kcs or less at 60 db down.

G-76 less power supply and speaker, #3338.....	376.25
G-76 transistorized 12V DC power supply (neg. ground), #3350.....	145.00
G-76 power supply for 117V AC w/speaker, #3349.....	145.00



GONSET

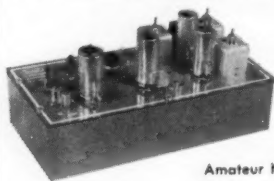
Division of Young Spring & Wire Corporation
801 SOUTH MAIN ST., BURBANK, CALIFORNIA

EXPORT SALES: WESTREX CORP., 540 WEST 58TH STREET, NEW YORK 19, N.Y.

Tecraft **DEPENDABLE** and priced right

TECRAFT CRYSTAL CONTROLLED CASCODE CONVERTERS

For Amateur, Commercial And Special Services



USE WITH
ANY
COMMUNICATIONS
RECEIVER

\$44.95

Amateur Net
MODEL

CC-50 50-54 mc -
6 meters
CC-108 108 mc - Sotel-
lite Frequencies
CC-120 For Aircraft
Frequencies

CC-144 144-148 mc -
2 meters
CC-148 Aircraft and In-
dustrial
Frequencies
CC-220 220-225 mc -
1 1/4 meters

Specify I.F. Frequency

CRYSTAL-CONTROLLED CONVERTERS FOR 10 AND 15 METERS

Model C-3-21 15 meters
Model C-3-26 10 meters

Choose IF output between
2 and 6 mc. to suit your
receiver.

\$34.95



TECRAFT VHF TRANSMITTERS

For Mobile And Fixed Stations



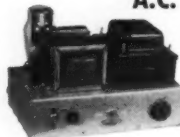
Complete with
Crystal & Tubes
Amateur Net

\$59.95

Model TR 20/21 (10-15 meter band) 6AU6 Osc. 5763
buf/dblr. - 6360 Power Amplifier. 20-25 watts input.
Model TR 20/50 (6 meter band) 6AU6 Osc. 5763
buf/dblr. - 6360 Power Amplifier. 20-25 watts input.
Model TR 20/144 (2 meter band or CAP) 6AU6 Osc.
5763 buf/dblr. 5763 buf/mult. - 6360 Final Amplifier.
20 watts input.

Model TR 20/220 (1 1/4 meter band) 6AU6 Osc. 5763
buf/mult. - 6360 buf/mult. - 6360 Power Amplifier. 20
watts input.

A.C. POWER SUPPLIES



MODEL PTR2
Provides power for
any Tecraft trans-
mitter. It will also
power the compan-
ion converter.

\$39.95

Tecraft

EQUIPMENT CRAFTERS

P. O. Box 84 • South Hackensack, N. J.

Atlas 8-9020

Cuyahoga County AREC aided the Cleveland Police in locating and tracking down three juveniles on bicycles who were breaking all the glass they could find in the streets. After they were picked up the boys were busy with broom and dust pan cleaning up the damage. Mobiles who participated were AEU, MAE, QXC and K5AAG. The Geauga County ARC meets the first Tue. of the month in the American Society for Metals Building in Newbury. Columbus ARA's *Carascope* informs us the club held a picnic sponsored by the v.h.f. section. K8MYG has a new baby girl. NWR vacationed for two weeks in Florida. FSM, NOY and K8LBZ are mobile. The OHKYIN V.H.F. Radio Society did its bit to handle Boy Scout traffic, with DQK, OOU, UAR, VBG, K8s IOI, GYK, HAL, MLQ, NHE, PUT and SGK participating. K8s CMI and LYR have their General Class licenses. K9PDJ moved to Wapakoneta from Wisconsin. Your SCM attended two hamfest picnics. The first was the Hocking Valley RC's Hamfest in Glouster, where it rained until mid-afternoon, with ten amateurs and their families braving the WX. The second was the Buckeye Net Picnic held at Mt. Vernon with 24 members and their families. The handling of traffic was discussed pro and con and plans were made for the coming heavy traffic periods. Lancaster & Fairfield County ARC elected K8JPL pres.; APT, vice-pres.; K8NTWE, secy. K8NTTU, treas.; and K8UCY, act. mgr. K8QIK has a new Drake 2A receiver. The stork brought a baby boy to RLR, who has moved to Wooster. DAE made BPL in July. K8EGK has been appointed as OO. The Great Lakes Division Convention will be held in Cleveland Oct. 7 and 8, so make plans to be there. Announcement will be made later as to where it will be held. Another large Ohio city may carry a series of articles on amateur radio like those BAH has edited in the *Cleveland Plain Dealer* for the past year. Many of you boys who over the years have been having fun getting into the CD Parties have had your wings clipped and there will be many more, for we want working appointments, not just those who hold appointments and do not even send their certificates for yearly endorsement. Traffic: (July) W8UPH 465, DAE 398, BZX 199, CXM 81, K8ONQ 73, W8OUU 40, K8MTI 36, GWK 35, MFY 33, W8AL 30, PMJ 30, K8DHI 29, W8YGR 27, K8QHH 19, W8GQD 16, IBX 14, K8HKU 10, MYG 9, W8LT 7, WYS 5, CL 4, K8EGK 4, W8CQP 2, K8NRNZ 2, EJT 1, LTA 1. (June) W8DQG 46, K8MMO 6, MFY 4, HVT 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RM: W2PHX, PAM: W2JUG and W2NOC. Section nets: NYS on 3615 kc. at 1900; NYSPTEN on 3925 kc. at 1800; ESS on 3590 kc. at 1800; ENY (emerg.) on 29,490 (Thurs.) and 145.35 Mc. (Fri.) at 2100; MHT (Novice) on 3716 kc. Sat. at 1300. Endorsements: W2PHX and W2ALO as ORS. We miss those large traffic totals from K2UTV, who is attending college. With club picnics, net outings, vacations and mobile, your SCM received little or no news for July. This is a good time to think about AREC activities. We need several good Emergency Coordinators in the southern counties in the section. Why don't you pass the word at club meetings or hamfests that your county or city should have an EC with an organization ready to move in immediately if disaster strikes? It's an important appointment easily overlooked until fire, flood, tornado, sleet storms or major accidents happen to hit your community. At present we have ECs for the following counties: Albany, Columbia, Greene, Dutchess, Putnam and Schenectady. Those in the larger cities and villages include Altamont, Spring Valley, Grassy Point, Westmere, Poughkeepsie, Elsmere, Scarsdale, Monroe, Brewster, Kingston, Copake Falls. We certainly would welcome nominees from Rensselaer, Ulster, Orange and Rockland Counties. In Westchester County, how about Yonkers, New Rochelle, Peekskill, Pelham, White Plains and the other large communities? Think it over and send your candidate's name to W2KGC, our SEC, or to your SCM. Traffic: (July) K2YZI 351, K2MBU/2 115, K2OZT 79, W2ALO 73, K2RKY 56, W2PHX 39, W2EFU 27, W2HLH 24, W2PKY 15, K2HNW 6. (June) W2PHX 110, W2HLH 7.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannels, W2TUK—SEC: W2ADO, RM: W2VDF, PAM: W2UGF, V.H.F. PAM: W2EW. Section Nets: NLI 3630 kc. nightly at 1930 EST and Sat. and Sun. at 1915 EST; NYC-LIPN, 3908 kc. Mon. through Sat. from 1730 to 1830 EST; NYC-LI AREC, 3908 kc. Sun. at 1730 EST; the V.H.F. Traffic Net, 145.8 Mc. Tue., Wed. and Thurs at 2000 EST. The fall operating season is rapidly approaching and our section nets are looking forward to the increased traffic load. In order to cover this increased activity our nets require additional outlets. If you desire cover phone, c.w. or strict-

(Continued on page 120)

operation: 40 meters!

Not working 40 meters? We suggest you give this band serious thought!

There's fine "rag-chewing" and good DX to be found on 40.

You'll enjoy this fun-filled band even more with efficient, maintenance free

Mosley antennas. DX-Rated for top performance.

40-D DIPOLE LOADING COIL

Make an inexpensive, fine performing dipole transmitting and receiving antenna at about $\frac{1}{2}$ the length of a full size dipole—just 37 feet! Only one coil necessary. Rated to a full KW.

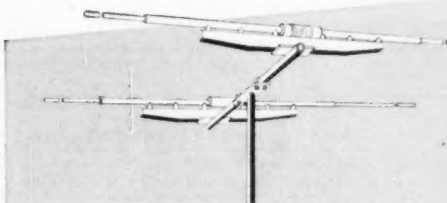
Amateur Net \$7.95



TD-2 TRAP DOUBLET

Resonates at 40 and 75/80 meters providing a typical figure eight, $\frac{1}{2}$ wavelength pattern at each resonant frequency. Overall length is 114 feet, 11 inches. Mosley "Sr." traps are aluminum enclosed and are frequency stable through wide climatic conditions. End insulators are high grade ceramic. Center connector securely holds No. 14 copper-weld wire. Rated to 1 KW. A complete antenna ready to go!

Amateur Net \$37.75



VPA-40-2 "Vest Pocket" BEAM

Ideal for low cost 40 meter operation - and this wonderful little DX antenna is only the size of an ordinary 20 meter beam! Rated to in excess of 1 KW.

Amateur Net \$74.95

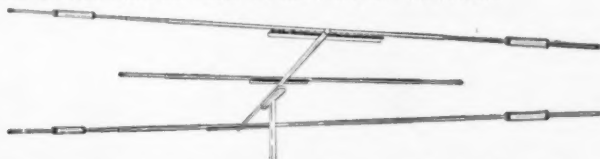
TA-20-40 THE BIG SIGNAL BEAM FOR 20 AND 40 METER OPERATION

For those radio amateurs who will not accept less than the finest...

Performance to satisfy the DX enthusiast!

Built for operation at maximum amateur legal power. Frequency stability under all weather conditions. Tilting head included for ease of installation. Fully rust and corrosion proof - guaranteed! Holes are factory pre-drilled and elements color coded. Just one coaxial feed-line needed. Assembled weight with tilting head, 150 pounds.

Amateur Net \$337.50



Mosley Electronics Inc.

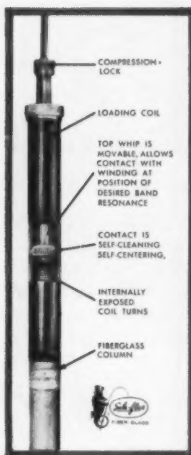
4610 N. Lindbergh • Bridgeton, Missouri

Mosley Dipole Connectors and Insulators are available to make it easy for you to construct your own 40 meter antenna using the 40-D Dipole Loading Coil.



BAND-SPANNER

streamlined mobile antenna for
effective 5-band operation



The well established performance advantages of center-loading for mobile antennas are obtained without compromise by exclusive Webster design which entirely eliminates large unsightly loading coils.

Band Spanner is truly streamlined... distinctive... fine looking on any car. Fiberglass support column is strong, durable, lightweight... unaffected by moisture. Loading inductor is wound directly on column—no joints to corrode—is encapsulated in durable plastic for lasting protection. Band Spanner is a well-proved performer on 5 bands... 80, 40, 20, 15, 10 meters... can be resonated for maximum performance anywhere within these bands by simple adjustment of the stainless steel top whip. No multiple coil arrangements or other tuning at the base.

TWO MODELS...
Short Band Spanner, 37" telescoped, 93" extended.
Long Band Spanner, 63" telescoped, 117" extended. Both models have standard 3/4-24 threaded (M) base fittings.



ANTENNA
2475
(less mount)

WEBSTER Manufacturing, 317 Roebling Road, South San Francisco, Calif.

Gentlemen:

Please send free booklet, "Mobile Antennas—Simple Steps to Peak Performance."

Name _____ Call _____

Address _____

NUMBER STREET

City Zone State

WEBSTER MANUFACTURING
317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIFORNIA

ly v.h.f., this section offers a traffic-handling group to fulfill your need. All nets welcome newcomers. Outlet needs at this moment are in the New York City Metropolitan Area on the 80- and 75-meter nets. Our V.H.F. Net requires liaison stations capable of operation on h.f. and v.h.f. bands. Congrats to W2EW, who has earned his fourth BPL card on the V.H.F. Net. Many have noted the absence of W2KEB from our BPL ranks. It is with regret that I report the departure from our section of Georgia and her well-known OM, W2KFV. They are now located in Sun City, Ariz., where they will hold forth on all bands, concentrating on 20-meter s.s.b. with their S-Line and tri-band beam. The BPL records tell only part of the story of this team. Their devoted service to amateur radio in the NYC-LI section will long be remembered. K2UFT filled in as Acting RM for W2VDT during the summer months. In his first month's return to the traffic ranks W2GKZ sent in an impressive traffic total. K2CMJ received his WAC award. W2CSE is now active on 6 meters. W2GPT was impressed by the Vermont v.h.f. gang and the power-plus stacked beams. Bea said her six watts seemed lost but she made several contacts. W2GWW is running 100 watts to a homebrew rig on 144 Mc. K2AZT completed his Heath GC1-A in time for a New Hampshire camping trip. W2JTC passed the Tech. Class exam. K2RHN moved to New Jersey. W2TN1/3 reports from the District of Columbia where he will be operating on 2 meters during a year's work assignment there. K2DDK moved to New Cleveland and is only seven elusive cards from DXCC. K2OFD is now using a 75A-4. K2TAQ worked his brother, K3IUZ, for the first time on 50 Mc. using a Communicator III and an eleven-element Yagi. K2TPU and his sister, W2A2-BEA, are enjoying 144-Mc. work. K2VDR is working on transistorized crystal-controlled converters for 6 meters. W2LZF is on 6 meters with a Viking Challenge and a Heath XC-6 converter. W2NYR is a new station in Dix Hills using a Globe Chief and a multi-band vertical. Your SCM added a five-element 6-meter beam to the station, with the transmitter soon to follow. K2DEM, a BPL Medallion winner and one of our section's active stations, moved to New Rochelle with his mother, K2-UTP, and dad, W2ASL. It is with deep regret that I report the entry of W2YKM to Silent Keys. W2ZNG passed the General Class exam on the first try without the Novice-Tech. route. W2HGI passed the Tech. Class exam and enjoyed his first operation on 2 meters with a Communicator II. W2GAB passed the General Class exam with help from the OM, K2SLD. K2OEI is running 100 watts on 2 meters with a 417-A converter and four-element quad. Bill reports a good increase in 144-Mc. activity on Staten Island. Your attention is invited to the Hudson Amateur Radio Council Convention to be held Oct. 15 at the Statler-Hilton in N.Y.C. An excellent program has been planned. Of particular note to appointees and others is the ARRL forum at which time we will meet neighboring SCMs, SECs and our Hudson Division Director and discuss section and division activities. Hope to see you there. K2UFT 335, W2EW 246, W2GKZ 173, W2ACZG 143, K2CMJ 138, W2RED 105, W2KWZ 102, W2OKU 98, W2CSE 76, W2GPT 76, K2RBW 70, K2DNY 54, K2RHG 34, W2GWW 21, K2THY 19, W2PFI 18, K2YQK 12, W2EC 8, W2LKG 8, K2OEI 8, K2ADL 7, K2QBW 6, K2AZT 5, K2SJP 5, K2DEM 4, W2HGI 2, K2RHN 2, K2MEM 1, (June) W2VDT 128, K2SJP 10.

NORTHERN NEW JERSEY—SCM, Edward Hart, jr., W2ZVW—SEC: W2APY, RM: W2RXL, PAMs: K2-SLG and K2KVR. W2CVW is NCS for NJN Sat. nights and is doing a fine job. W2EBR had receiver trouble, but now is manager of EASN. W2CQI and W2COZ added an electronic keyer and a 40-ft. tower. K2KVR worked some fine short-skip stations on 6 meters. W2-TLW was high New Jersey scorer in the Maine QSO Party. W2CCF visited the Connecticut Wireless Assn. on Field Day but did not meet your SCM. K2UKQ still is chasing DX on 20 meters. W2COO has a new Viking and puts out a much stronger signal. W2GZB was in Pennsylvania portable, but is back at the old stand. K2THC was on vacation for two weeks so his traffic total is only 1084. W2RXL has a Heath 6-meter mobile job. The NJN held 31 sessions, 371 stations checked in and 348 messages were handled. W2EDG joined AREC and RACES, two groups that all hams should join. Apply to W2APY or your EC. K2UCY has an electronic keyer and a DX-100 and made BPL. W2FB is getting back to business after a vacation in New York and Vermont. W2ZI reports the NJPN had 31 sessions, 710 stations checked in and 120 messages were handled. K2RHN is working all kinds of DX on 15- and 20-meter phone. K2PVH is NCS for NJPN on Sat. W2EW met W2BSK, W2LAZ and W8MBL while on duty with the U. S. Army Reserve at Ft. Rodan, Mass. K2ACJ has ordered and is waiting for a 60-ft. tower. K2UWN is working on a receiver design for 6 meters. K2PTI reports

(Continued on page 122)

You Asked For It... Here It Is!

COSMOPHONE "1000"



- ▲ A Self-contained 1 KW Transmitter-Receiver
- ▲ A True Table-top Station with NO Sacrifice of Performance

SPECIFICATIONS

TRANSMITTER

INPUT: Full 1 kw on Voice Peaks (Meters Read 2500 V at 400 ma) into a pair of 4 x 300 A's
UNWANTED SIDEBAND: 42 db down
DISTORTION (SSB): Third order products approx. 32 db down
FREQUENCY STABILITY: Drift less than 100 cycles.

CALIBRATION: Built-in 100 kc marker
AUDIO CHARACTERISTICS: 200-3100 cps

MIKE INPUT: High impedance
VOX: Built-in
LEVEL: Automatic level control
METERING: Screen, plate, and grid current, plus RF output
RF OUTPUT: 52 ohms
VFO's: Dual VFO's permit transmitting on the receive or any other frequency
CONTROLS: Vox, Qt, ALC, Grid Tuning, Plate Tuning, Antenna Loading, Audio Gain, Band Switch, Meter Switch

RECEIVER

SENSITIVITY: 1 microvolt for 6 db S/N
SELECTIVITY: 3.1 kc mechanical filter plus a T-notch filter
STABILITY: Drift less than 100 cycles from a cold start at room ambient
TUNING KNOBS: Coarse gear ratio of 20:1, fine gear ratio of 100:1 gives a 1 kc dial reading per division
CALIBRATION: Built-in 100 kc marker
IMAGE AND IF REJECTION: Better than 50 db
AUDIO DETECTOR: Balanced detector for SSB and CW, diode detector for AM
MODE SWITCH: Selects up or low SSB, or up low AM, or CW
DUAL RECEPTION: Two VFO's permit reception of any two frequencies on one band with the flick of a switch
BFO: Crystal controlled
METERING: 5-meter
CONTROLS: T-notch filter, audio gain, RF gain, antenna trimming, tune selector, phone jack, tune A and B

"The COSMOPHONE 1000"—a complete Station, Receiver, and Transmitter. Dimensions: 17 inches wide, 12 inches high, and 15 inches deep. Power Supplies packaged separately, can be placed under operating desk. Price: "The COSMOPHONE 1000" with Power Supplies...\$1,550.00.

A Product of

For additional information and dealer nearest you, write Dept. QST-10

COSMOS INDUSTRIES, INC.

31-28 QUEENS BOULEVARD
 Long Island City, N. Y.

LIKE INNUMERABLE HAMS

*You too will thrill
to the performance of
these TRANSCON UNITS
NEWLY DESIGNED
COMPLETELY RE-ENGINEERED*

VOXBOX

LETS YOU KEEP BOTH HANDS ON THE WHEEL



A voice-controlled relay device for voice-operated "break-in" with any voice modulated rig either fixed or mobile. Gives you tremendous advantage in contest operating, traffic handling, telephone type conversation and "two hands on the wheel" mobiling.

Amateur Net **\$35.70**

TRANSCON TWIN NOISE SQUELCH

Can be easily installed in any car radio. Tubes: 6AL5 and 12AX7. Requires 150-225 VDC designed for 6 or 12 volt auto or marine systems.

Amateur Net **\$17.90**



FIELD STRENGTH METER

For mobile, marine or fixed station use. May be installed in series with broadcast receiver antenna and switched in or out of circuit as desired. Lets you know you are Amateur Net "getting out."

\$18.80



ARROW ELECTRONICS, INC.

65 CORTLANDT ST., NEW YORK 7, N. Y. Dighy 9-3790
525 JERICHO TURNPIKE, MINEOLA, N. Y. Plover 8-8686

Canadians: available from

ELECTRONIC TUBE CO. 464 MCGILL ST., MONTREAL 1, P. Q.

that officers of the Irvington RAC are W2YGM, pres.; W2IMM, vice-pres.; K2RKL, treas. K2GEC, secy.; and W2TRA, chief operator. W2CJX has been laid up but is OK and will be back soon. K2CBG is vacationing in California. K2VNL is a very active NJN member. The NJ6 reports 9 sessions, 85 stations checking in and 6 messages handled. W2RON blew the 6146s in the Viking. Traffic: (July) K2THC 1084, W2COO 841, K2UCY 564, W2ZCCF 320, W2APY 184, W2FGP 119, W2ZEDG 118, W2RXL 107, K2VNL 106, W2EBR 79, W2EBG 62, K2EQP 32, W2AGQI 45, W2BIAT 43, W2AGZ 36, K2MFE 34, W2AGQZ 32, K2CBG 25, K2VPV 25, W2FKL 2 25, K2AGJ 24, W2CVW 21, K2MFX 20, W2ZVW 17, K2JTU 10, W2RON 15, W2AKM 13, W2DRV 12, W2CFB 11, K2SLG 10, K2UKQ 4, W2MZR 2, W2NYI 2, K2RHN 2. (June) K2CBG 21, W2CFB 6, W2EJZ 4. (May) K2CBG 16.

MIDWEST DIVISION

IOWA—SCM, Russell B. Marquis, W0BDR.—WIUED, ARRL Assistant Secretary, visited the Sioux City Club. K0BSG, PAM, reports 1018 QNS, 169 messages handled for 26 sessions of the 75-Meter Phone Net. W0PZO, RM, reports 224 QNS, 431 messages for 26 sessions of the TLN, GQ, Midwest Division Vice-Director, is vacationing in Hawaii. K0UKY, operating portable at the Boy Scout camp near Woodward, made BPL by originating messages. The Burlington Club assisted the Police Department by providing communications for an Air Show, using mobiles, fixed stations and its communications truck. K0EXN has been appointed SEC for Iowa. Other new appointees are K0DQC, QDC, TBL, W0DUA and VAU as ECs and K0HBD as ORS. SCA renewed his EC, RM and ORS appointments. K0OTV has been appointed RACES Radio Officer for Grundy County. DUA received a net certificate for TLN, LCX has a new SX-101. The Sioux City Clubs have combined and formed the Sioux City Amateur Radio Association with K0MMX, secy.; and FZO, FBV and MHC, board of directors. Ex-K0MMZ is now W3NCT. Traffic: (July) W0BDR 1701, LGG 1504, LCX 1484, SCA 926, NTB 327, DUA 306, PZO 254, K0UKY 192, W0QVA 64, WVE 58, K0HBD 54, BSZ 37, KAQ 34, W0BLH 30, K0CNC 25, W0PTL 25, K0AUU 18, EXN 17, BXP 14, SEW 14, GOT 11, IHC 10, JPJ 9, TGT 9, W0UHO 8, SLIC 7, K0MFX 5, KZC 4, POI 4, DBW 2, OTV 2, W0QVZ 2. (June) W0LJW 18, K0AUU 10.

KANSAS—SCM, Raymond E. Baker, W0FNS—SEC: VZM, Asst. SEC: LOW, RM: QGG, PAM: UTO, V.H.F. PAM: HAJ. The Kansas Federation of Amateur Radio Clubs has appointed IUB as publicity director to handle Kansas Centennial certificates; K0RNZ, Awards; Dorothy Hall, certificates; K0IZM advertising. Basic rules are: (1) A Centennial certificate for working 25 stations (Kansas) 1961. Dx stations need only 10. (2) Two QSO Kansas Parties, Jan. 28, 29 and another in December. (3) Three trophies given: (1) Kansas ham who works the most Kansas stations, (2) U.S.A. station that works the most Kansas stations, (3) DX station that works the most Kansas stations. Success of this venture depends on the Kansas amateurs, so let's give IUB, RNZ, GIA and IZM all the help possible. K0REG, # handled traffic at the Wellington Scout Campore. K0TNW, EC Zone 10, reports on two trips. BBO reports obtaining 5 walkie-talkies on 3885 kc. for emergency work at McPherson. K0SWR reports that the Flint Hills Club has secured its Official Shirts. K0RNZ led Kansas in the Sweepstakes Contest and also has a new 6/2-meter converter and is going to 500 watts on 2 meters. K0GHI has a Class I frequency measurement MARS rating. K0QWN operated portable at Harper High School demonstrating amateur radio to the students. Traffic: (July) K0HGI 216, W0FNS 139, TOL 137, ABJ 97, ORB 91, SVZ 65, K0UAX 62, W0UTO 54, K0HVG 45, IZM 30, W0FNS 24, W0FK 22, K0VBD 21, REG 20, W0AMJ 17, K0QKS 14, GIG 12, EFL 8, PIE 7, SMQ 6, TNW 4, JID 3, W0WFD 3, K0ZSG 2. (June) W0HJ 526, K0BCH 302, HGI 228, QWN 13, W0FIR 9, VZM 9, BBO 4.

MISSOURI—SCM, C. O. Gosch, W0BUL—SEC: K0LTP, RM: OUD, QXO and K0NK, PAM: BVL and OMM. Net reports: MON (3580 kc. 1900 CST) sessions 21, QNI 135 QTC 148; NCSs OUD 14, K0QCC 5, RTW, TPK, K0ONK 1. (June) SMN (3580 kc. 1600 CST 8) QNI 9, QTC 1; NCS OUD. (July) MON (3580 kc. 1900 CST M-8) sessions 26, QNI 135, QTC 140; MCSs OUD 19, K0ONK 5, K0QCC 2. SMN (3580 kc. 1600 CST 8) sessions 5, QNI 13, QTC 2; NCS OUD. HBN (7280 kc. 1205 CST M-F) sessions 14, QNI 154, QTC 179; NCSs K0HGI 4, WAL 3, K0JXD 2, K0LTP, K0ONK, K0BFH, K0HVG and K0UAX 1. K0VIQ/K. VPH report the acquisition of a new 350-watt rig with accompanying stronger signal and more contacts. K0VAY has graduated from the Novice ranks. OHC is building a c.d. shelter complete with ham communications

(Continued on page 184)

THIS BEAM THINKS IT'S A PIPELINE

THE NEW MODEL TB 1000-4 10-15-20 Meter Antenna

- Famous Hornet Quality
- Rated at Maximum Legal Power
- Four Elements On Each Band

Model TB 1000-4 Cash Price, Only \$119.50

YOU WILL THINK SO TOO!

The four triband elements, in operation on each band make the difference —

A Powerful four element punch!

NOW AT YOUR DEALERS!

World famous Hornet antennas are now available from dealers. See your dealer today for the model of your choice, or order direct from Hornet.

THE NEW MODEL TB 750

This husky antenna replaces Hornet's famous Model TB 600, and is now rated at 750 watts AM or SSB.

Model TB 750 Cash Price, Only \$69.95

THE NEW MODEL TB 1000 offers top performance in three element design.

- Famous Hornet Quality
- Rated at maximum legal power

Model TB 1000 Cash Price,
Only \$89.75

ALL MODELS . . .

- Are Pre-tuned and Easy to Install
- Have Custom Fittings of Cast Aluminum
- Use a Single 52 ohm Coaxial Transmission Line
- Have completely weather-sealed Frequency-Dividers*
- Have Elements of 6061-T6 Aluminum

All Prices F.O.B. Dealers Store or Factory

Model TB-500
Cash Price
Only \$59.75

WRITE FOR
FREE
ILLUSTRATED
CATALOG

HORNET

Antenna Products Co.

P.O. BOX 808 • DUNCAN, OKLA.

MAIL YOUR ORDER TODAY — 10 DAYS FREE TRIAL

HORNET ANTENNA PRODUCTS CO.
P.O. Box 808, Duncan, Okla.

- ☐ Please ship one Model _____ Hornet tribander. Cash price in full is inclosed.
- ☐ I wish to purchase one Model _____ Hornet tribander, and would like to use your time-payment plan.

NAME _____

My Call
Letters Are _____

ADDRESS _____

CITY _____

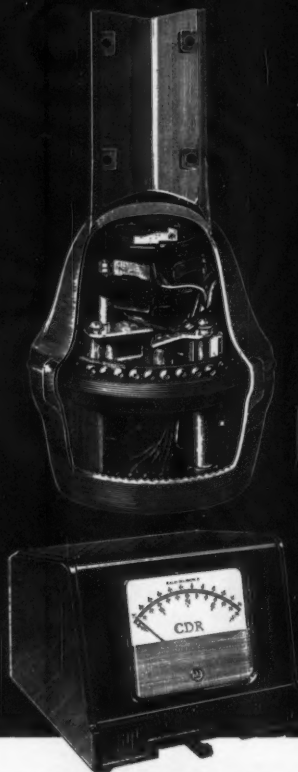
STATE _____

ABSOLUTELY NO RISK ON YOUR PART

CDR

"HAM-M" ROTOR

install in any type of tower



COMPLETE PACKAGED SYSTEM. Nothing else to buy. Can be installed atop any tower, and inside most towers. North Center meter scale kit. Base plate for internal tower mounts. Anti-meter flutter kit. Mounts in 30 minutes. **EXTREMELY RUGGED.** Extra heavy-duty. Thousands now in use, rotating every conceivable antenna combination. Wind-proof, ice-proof, moisture-proof! Won't drift! Provides 3500 in.-lbs. resistance to lateral thrust! Will replace any existing rotor installation. Gives superior performance. At your distributor. Only \$119.50. CDR Ham Rotors, Cornell-Dubilier Electric Corp., South Plainfield, N. J.

CDE

**CORNELL
DUBILIER**

Affiliated with Federal Pacific Electric Company

equipment, for demonstration purposes at the Missouri State Fair. K0VXU reports cleaning up his signal on the higher frequencies and has embarked on a DX spree. K0PL also reports working some rare ones. YKC will operate a portable station at the Peach Festival at Campbell. He has just received a new 100V transmitter. MKJ has a new antenna and reports improved operation. K0PFF reports a traffic relay from the local Scout camp to Kirkwood with accompanying publicity in the St. Louis press. (This type of publicity is an excellent boost for ham radio, fellows.) LFE reports a registration of 300 with 150 licensees at the V.H.F. Picnic at Bowling Green. V.h.f. devotees from Michigan, Wisconsin, Illinois, Iowa, and Missouri were in attendance. New officers of the Jefferson Barracks ARC are ODI, pres.; K0SZX, vice-pres.; W0KWJ, secy.; K0DCQ, treas. Traffic: (July) K0NKK 1152, K0WAL 691, K0VBV 182, UTX 172, VXU 107, W0KIK 76, RTW 49, OVV 28, BUL 27, K0LGZ 27, W0MKJ 21, BVL 17, PNE 15, PQ 10, K0PCK 8, PEF 8, VPH 6, VIQ 5, VUQ 2. (June) K0KBD 183, W0KIK 118, QZP 27, TPK 12, K0PFF 4, W0GBJ 1. (May) K0VBV 1.

NEBRASKA—SCM, Charles E. McNeel, W0EXP—The extremely hot and dry weather in the Nebraska section seems to have had a slowing-down effect on ham radio activity so it is hoped that next month things will be back to normal. The Western Nebraska Net, reported by NIK, had QNI 630, QTC 101. The Nebraska Section C.W. Net, reported by NYU, had 23 sessions, QNI 104, QTC 38. The Nebraska 74-Meter Phone Net has elected K0DGW as net manager for the coming year and reports QNI 783, QTC 174. K0DFO has a new jr. operator. The Annual North Platte Hamfest was held Aug. 7 at Cody Park with over 100 in attendance. New appointments in July: GGP and OXN as ECs, DDT as ORS and K0VAZ as OBS. Traffic: (July) W0ZJF 111, K0MSS 75, DGW 70, DVW 66, W0NYU 66, W0ZJ 35, K0RBL 32, QTC 40, KJP 36, W0DDT 35, K0ROP 22, RTZ 15, UWK 17, W0BOQ 14, K0DFO 12, W0HTA 12, NIK 12, OCU 12, FTQ 11, GGP 11, K0VIA 9, W0VEA 7, KDW 6, K0UQN 6, DVW 5, W0EEQ 5, K0MZV 5, SCM 5, ROA 4, W0WKP 3, K0SLB 2, TUH 2, W0RJA 1, K0VID 1. (June) K0MZV 21.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Victor L. Crawford, W1TYQ —SEC: EOR, RM: KYQ, H.F. PAM: YBH, V.H.F. PAM: FHP. Traffic nets: CPN, Mon.-Sat. 1800, Sun 1000 on 3880 kc.; CN, daily at 1845 and 2030 on 3640 kc.; CVN, Mon., Wed. and Fri. at 2030 on 145.98 Mc.; CTN, Sun. at 0900 on 3640 kc. KP4API made BPL at Camp Ken-Mont in Kent using an HT-32A and an NC-300. MDB is active on CPN again. FNE, RAN and WFI helped OBR tune his new 20-meter beam. The Tri-City Amateur Radio Council participated in the Connecticut State Firemen's Parade Aug. 21. BDI added two new countries. KIMBA is looking forward to fall and a change from the night shift so he can check into CPN. FVY added Michigan on 30 Mc. to make his state total 26. K0RLJ and K0ZAD give KIIVT a 170/153 country total. GVJ vacationed in Colorado. NWE is getting out with 6 watts and a three-element beam on 50 Mc. Let's all support the First Regional Phone Net, which was activated Sept. 7. K1CCB enjoyed the CD Party. K1CEC is back on the air after a year's absence. KIMNX passed the Conditional Class exam. KILFS enrolled in the AREC. KYQ reports CN met 31 times, handled 273 messages and had an average attendance of 74 stations. The second session handled 18 messages. High QNI goes to K1JAD, AW and RFJ. New Novices in New Haven are K1IOTN, K1IOMR and K1IOVH. K1NQM, K1MEG and K1NFD passed the General Class license examination. K1HTV works at WEL. K1KSH worked 35 states and 6 countries on 160 meters using a 222-watt antenna. ERB is planning a "V" beam for 160 meters. K1LXP is now in West Haven. KQY is moving to Madison, Conn. K1MBH likes his new DB-23. JJV is building an Apache. DIJ is on 6 meters with 75 watts and an eight-element beam. K1NOJM is a new Novice in Stamford. New appointments: K1CEC and QV as OPS, K1CEC as OO, QV as OB, ZAD as EC. Appointments renewed: K1AQB as OPS, K1CCB as CO. Reports received: OES from FVY; OO from K1GUD, K1IIVT, K1LFS, K1MBA, MBX and NWE. Traffic: (July) W1AW 277, KYQ 213, K1JAD 196, W1OBR 169, KP4API 125, W1YBH 121, EFW 80, MDB 70, RFJ 28, K1GGG 24, DGK 23, CBV 13, W1TYQ 10, BDI 9, CUH 8, K1MBA 5, W1EBW 4. (June) W1EFW 149, K1DKG 22, BSB 15, W1EBW 11.

MAINE—SCM, Jeffrey I. Weinstein, W1JMN—The State of Maine Official Bulletin System is now in full operation. Bulletins and information of state-wide interest from my office as well as those pertaining to national matters are being transmitted regularly. JMN
(Continued on page 126)



E. Robson, VQ4ERR, of Nairobi, Kenya Colony, Africa

"...performance matches the thoroughbred appearance..."

...writes Robbie, VQ4ERR, of his Electro-Voice Model 664 Cardioid Microphone

Doubtful that a fine cardioid microphone — such as the Electro-Voice Model 664 — could improve your signal? Then read these excerpts from a letter written to us by VQ4ERR, long recognized as one of the world's top DXer's. He writes: "I thought you might like to know the results and comparisons since I added my Model 664 ... I talk to a DX friend daily (MP4BBW) ... he at once noticed the difference and said 'So your new mike arrived at last ... knowing you, I can tell you that the mike IS YOU ... it is exactly as you talk ... don't go back to your old one.' His comments made a great impression as I had not told him I was using my new mike. ..."

VQ4ERR adds: "... all reports say, incidentally, that it (the Model 664) has additional bass and quality lacking in my other mikes and cuts through QRM just as well ... it is a pleasure to own such a mike ... the performance matches the thoroughbred appearance in every way ... I find myself using less slang and taking more trouble with my speech ... out of sheer respect!"

What the Model 664 accomplished for VQ4ERR — it can also do for you. Investigate the performance of this fine microphone at your Electro-Voice distributor — today. Connect it to your rig and try it on the air. The Model 664 Cardioid is guaranteed to meet our claims — or your money will be refunded.

TECHNICALLY SPEAKING: Variable-D Dynamic design of the Model 664 incorporates multiple sound openings to the back of the diaphragm — one each for high, low and mid-frequencies. Response is free of dips and peaks. Uniform cancellation of sounds, echoes, or reverberations from rear of microphone.

Pop-proof wire mesh grille minimizes wind and breath blasts. Output level -55 db. Rugged, exclusive E-V Acoustalloy diaphragm unaffected by moisture, humidity, temperature, and mechanical shock. Convenient ON-OFF switch easily converts for relay control, if desired.

Model 664 (without stand) List Price \$85.00

Model 664 (with Model 419 Desk Stand) List Price \$95.00

Electro-Voice®

Commercial Products Division

ELECTRO-VOICE, INC.

Dept. 100 Q, Buchanan, Michigan

NEIL TRANSMITTERS

Sound Better



NEIL Beta 60 watt Transmitter • 6 or 10 Meters

In a true 50 to 60 watt phone transmitter, the audio system must provide 25 to 30 watts output or the signal will suffer.

Two 6CZ5, 6AQ5, or 6BQ5 tubes simply cannot do it. That's why NEIL uses FOUR 6BQ5's in the Beta modulator.

All NEIL transmitters sound better because:

- they do NOT use carrier controlled modulation, nor choke modulation, nor single tube modulators
- the modulator tubes ARE capable of 100% modulation
- the final is extremely stable so that it CAN be 100% plate and screen modulated

To top it off, a NEIL transmitter will amaze you with its ease of tuning.

- no screwdriver tuning
- tunes in seconds with front panel controls
- no long complicated initial tune-up or QSY
- no overtone oscillator circuits
- uses inexpensive low frequency crystals
- complete with tuning meters; no meter switching or calculation involved

Check the values: NEIL transmitters tune easier (all controls on front panel, no screwdriver tuning), and sound better (because they are fully modulated using the best type of modulating system with the finest audio circuitry).

For use in FIXED STATION or MOBILE OPERATION without any modification.

TRANSMITTER PRICES • 6 OR 10 METERS

BETA transmitter, 60 watts. Requires 600v at 100ma, 300v at 200ma.

Wired	\$125.00
Kit	98.00
ALPHA transmitter, 20 watts. Requires 300v at 200ma.	
Wired	\$78.50
Kit	58.50
Power Supply for fixed station use, wired	39.95

MOBILE transmitter, 20 watts. With built-in mobile power supply for 12 volt operation.

Wired	\$159.00
Kit	134.00

All transmitters only 3 inches high.

Please specify band and filament voltage desired.

SEE YOUR DEALER, OR ORDER FROM

THE NEIL COMPANY

**1336 Calkins Rd.
PITTSFORD, N. Y.**

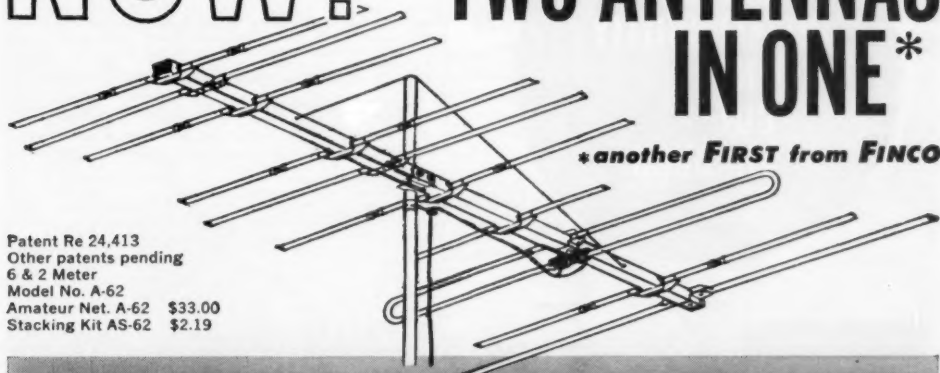
• BAKER 5-6170 •

can be heard on 3600 kc. at 1800 week ends, while BXT and JDA are the State nets daily. Although the Sea Gull Net (GRG and BXL co-PAMS, 3940 kc. at 1700 daily) and the Maine Slo-Speed Net (GVQ, RM, 3726 kc. at 1730 Sun., Tue., Thurs. and Sat.) are conducting excellent sessions, the Pine Tree Net (EFR, RM, 3596 kc. at 1900 daily) could employ more support from State of Maine amateurs. The Pine Tree should be given a try by everyone. I think you'll find it a pleasant and rewarding experience. Individuals who are interested in receiving an ARRL appointment are requested to submit their preliminary application to your SCM (Jeffrey I. Weinstein, JMN, 79 Caleb Street, Portland 4, Maine) at the earliest opportunity. Appointments are currently available to all classes of licensees who are ARRL members. Do your part in PICON by rendering your support to the AREC organization in your area! Justify your existence as a radio amateur! Northern Maine (KFY-EC), Central Maine (GRG-EC) and Southern Maine (AHM-EC) are looking forward to 100 per cent quotas of AREC members in their respective areas. Join now! Traffic: KIMJN 196, DUG 47, WIUDD 42, GRG 39, KIKSG 19, DYG 8, KIJMN 3, KIMPM 3, WIAHM 4, KIGVQ 4, BDQ 2, WIOTQ 2, KILAA 1.

EASTERN MASSACHUSETTS—SCM. Frank L. Baker, jr., WIALP—SEC: AOG. New appointments: KIJUR as OBS, YHY and KJHU as OBS, FZU is a Silent Key. KIKXQ has a DX-35, a BEX 348 and a 500-watt rig on the way. NJL made the BPL, KIJML worked on 6 meters and heard VOIDW. New on 6 meters: PJD, KIS, KZV, IKX, NDS and HGF. KIKZU has a new shack. LMZ worked VE2II on 2 meters. KIMHC worked some DX on 2 meters during the Aurora. LMZ is attending Wentworth Inst. and is president of the Bedford Radio Club. AUQ worked KZKOE, ex-IANI. KIKYN came out first in New England in the Boys' Life Radio Contest and 14th in the nation. KIJUR has a Valiant on 10 and 40 meters. DFS was principal speaker at the Augusta Hamfest. KIAQI says if any ECs want 6-meter mobile rigs for drills or emergency work to call AOG. The Mass. Phone Net had 532 stations on and handled 131 pieces of traffic. The Eastern Mass. 2 Net had 407 stations on and handled 213 pieces of traffic. VP3AD visited BB. BB sent out a nice 160-meter DX bulletin. KIKZP, IWB and KN1-PKX are on 2 meters. FEC says the Nemasket Net still is active Sun. on 28.780 kc. and the gang was out on Field Day. KIJAW says traffic is moving smoothly on the 40-meter nets. The following are on: KIS, BYL, BYV, IXT, JIU, MHM, WINJL and UE. PEX, KIGNR, AFF and WIZSS are on 40-meter phone. SU is active on the air. NF worked VU2ZJ, a new one. MEG is State MARS Director. Ten Burlington hams were out on Field Day using the call CB/L. KILJK has a 40-ft. tower with a Hornet Triband beam, also an inverted "V" dipole 55 feet up similar to K7GCO's. HIL has a Gonset Tribander, a six-element for 6 meters and an eleven-element beam for 2 meters. KIJUR joined MARS. NOS has a Globe Scout 680. PEX is a new phone on the air and is a member of AF-MARS. FJJ has a new tower Tribander. KBN has a new HT-37. KINCS is in the 2-meter net. KIJCC is back on the air. KIMEM has a new DX-100B. KIIDL is rebuilding. KILCQ is back to normal; indians are all gone. DPO has an HT-32 and an HT-33A on all bands. The 2200 Club Net meets each night at 2200 on 50.25 Mc. KIJU has another commercial ticket and is putting up a beam for 20 meters. KINH has a Globe Scout Deluxe, an SX-128 and is on 6 meters. KNIKT has a Knight T-50 transmitter, an NC-183 receiver and is on 80, 40 and 15 meters. Appointments endorsed: MKW Dennis, VYH Topsfield, VYI Radio Officer for Area 1. WNP Concord and DPO Chatham as ECs; BGW, AYG and UBC as OBS; LMZ, OES, DFS as PAM. FJJ has the 75-meter phone band. NJL as OBS and OPS. KIAH has a Navigator, is on 80 meters and is converting the 11-meter position to a stable v.f.o. for 6 and 2 meters. Many of the newer hams wonder why news sent in doesn't appear immediately, but it takes longer than that. This report, for example, was mailed in on Aug. 7 for the October issue. Traffic: (July) NJL 503, PEX 386, KIGNR 265, WIZSS 180, KIBYL 120, JIU 93, JAW 83, WIEAR 65, KILIX 61, WIOFK 58, SIV 42, GEK 31, KIBYV 23, WIAUQ 27, KIBGK 26, GYM 25, WIAOG 21, FJJ 20, KIKZP 20, WIZOP 18, KBN 16, KILCQ 8, WITWG 8, KIJCC 7, MHC 7, WIVYS 6, KICMS 6, WHIL 6, KIMEM 6, WIBB 3, KIAI 2, ODL 2. (June) WIAUQ 71, NJL 42, KILCQ 8, KYN 4.

WESTERN MASSACHUSETTS—SCM. Percy C. Noble, W1BVR—SEC: BYH, RM: DVW, PAM: DXS. Assistant to the RM for the Novice Net: KIJVJ. The WMN meets on 3560 kc. at 7 p.m. Mon. through Sat. The MPN meets on 3870 kc. at 6 p.m. daily. The WMNN meets on or near 3744 kc. at 6:30 p.m. Mon., Wed. and Fri. The First Region Net has added a phone session (Continued on page 128)

NOW! TWO ANTENNAS IN ONE*



*another **FIRST** from **FINCO**

Patent Re 24,413
Other patents pending
6 & 2 Meter
Model No. A-62
Amateur Net. A-62 \$33.00
Stacking Kit AS-62 \$2.19

Introducing..... THE ONLY SINGLE FEED LINE 6 & 2 METER COMBINATION ANTENNA from **FINCO**®

- Heavy Duty Square Aluminum Boom, 10 Ft. Long
- All Elements Are Sleeve Reinforced And Completely Pre-assembled With "Snap-out" Lock-Tite Brackets
- Boom Suspension Rods Are Supplied Completely Pre-assembled, Ready To Be Snapped Into Upper End Of Mast

ON 2 METERS

- 18 Elements
- 1 — Folded Dipole Plus Special Phasing Stub
- 1 — 3 Element Collinear Reflector
- 4 — 3 Element Collinear Directors

ON 6 METERS

- Full 4 Elements
- 1 — Folded Dipole
- 1 — Reflector
- 2 — Directors

OTHER ANTENNAS for the DISCERNING AMATEUR



6 METER
4 ELEMENT
AMATEUR NET
A6-4 \$17.16
STACKING KIT
AS-6 \$2.19



2 METER
10 ELEMENT
AMATEUR NET
A2-10 \$11.88
STACKING KIT
AS-2 \$1.83



1 1/4 METER
10 ELEMENT
AMATEUR NET
A1 1/4-10 \$11.88
STACKING KIT
AS-1 1/4 \$1.26

See your **FINCO** distributor

or write direct to

THE FINNEY COMPANY • DEPT. 18, 34 W. INTERSTATE ST., BEDFORD, OHIO

**IMPROVE
SPEECH
INTELLIGIBILITY
AND
CUT
THROUGH
QRM**

SHURE

Ten-Four



\$29.10
Amateur
net

MODEL NO. 405T controlled magnetic microphone with transistor amplifier

All the advantages of controlled magnetic microphone construction—ability to withstand hard usage and extremes of climate and weather conditions—are yours in this sturdy, reliable microphone. The Ten-Four 405T has a flat frequency response characteristic (200 to 4000 cps), controlled to provide maximum speech efficiency.

It is ideally suited for SSB-AM transmission. Fits naturally and comfortably in the palm of the hand... takes up minimum space in mobile or fixed-station equipment. Equipped with heavy-duty push-to-talk switch.

Shure Brothers, Incorporated
222 Hartrey Ave., Evanston, Ill.

**MICROPHONES, HIGH FIDELITY AND
ELECTRONIC COMPONENTS**

128

with DXS in charge. This is the first region net to try it, and we wish it the best of success. DVW took a well-earned vacation on the Cape. The WMN managed to keep its six-day-a-week sked but attendance was not too high during the summer months. The MPN reports 151 messages were handled during July with an average attendance of 16.84 stations. AGM reports that his new 100V is working very well on s.s.b. Westfield has two new Novices: KN1PES and KN1PKZ (the latter a sightless lad since birth). Western Massachusetts is allotted about twice this amount of space each month and I shall be glad to use that much provided you fellows supply some material! Traffic: W1BVR 105, K1IJV 81, LBB 70, W1WFE 63, DVW 52, KN1MGK 16, K1GCV 12.

NEW HAMPSHIRE—SCM, Robert H. Wright, W1RMH—SEC: K1GQK; RM: K1HK, PAM: I1Q. The GSPN meets at 1900 Mon. through Fri. and at 0630 Sun. on 3842 kc. The NHN (c.w.) meets Mon. through Sat. on 3685 kc. K1GQK is the new SEC for the State. He intends to promote interest in AREC activities in all corners of the State. Anyone interested in the EC posts in the counties now lacking, please contact either GQK or myself. N. H. ranked last in all the states in AREC participation in the past few years and we hope to improve the situation. Please give GQK your maximum support. YVX is now located at Westville, ZUS announces formation of the Central New England Net. Meeting time is 0645 Mon. through Sat. on 3842 kc. The Laconia High School Amateur Radio Society, K1OOP, has a Viking 1 and an NC-240D. Newly licensed K1PGA is the XYL of K1GQK. The Concord Area 6-meter stations have a new emergency and traffic net on 50.826 Mc. New officers of the Turkey River Amateur Radio Club are RMH, pres.; K1OKX, vice-pres.; YXA, secy.-treas.; and K1GQK, trustee. Endorsements: K1CIF as ORS, YHI as OPS and OBS. Appointments: GAH as EC for Sullivan County, K1ITS as ORS, Traffic: (July) K1CIF 1111, I1K 162, I1S 161, W1QGU 97, TA 86, CUE 38, ZUS 16, PFU 9, YHI 5, ALJ 4, K1CFX 4, I1H 3, MID 3, W1BYS 2, K1CIG 1. (June) W1ALJ 13.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: PAZ, RM: SMU, PAM: TXL. K1CRN is a new OES. The RISPN now meets at 1830 daily on 50.6 Mc. with net controls K1DZX, K1GRC, TXL and K1LCX. The net traffic was 163 with 150 QNL. The RIN held 11 sessions, 28 traffic, 38 QNL, with CMH, HLY, QR, SMU, TGD, JXD, K1BBK and K1M1J reporting in. K1CZH, secy. of the WISKT RC, invites all members to meet on 29.880 Mc. at 1830 for a club net. The NCRC election results are ETM, pres.; JFF, vice-pres. DEI and JFF are now on 6 meters. ETM has a new mobile rig. During the recent Boy Scout Jubilee Celebration, the CRA of Cranston set its equipment up at Scout Camp Yawgoog in hopes of contacting the National Jamboree at Denver, Colo. Although contact was not made, a demonstration was given. The Scouts, CRA members taking part were ZGH, KN1MOE, K1ADK, K1ABR and ZFG. K1ZHN reports working SM7BAU/MM, who was in the Pacific 500 miles from L. A. on 40 meters. He also reports lots of DX on 40 meters in the early hours of the morning. K1JNJ, OES, and K1HVN have left to join the Armed Forces for training in radio. Traffic: (July) W1SMU 724, TXL 215, CMH 162, K1BBK 45. (June) K1GRC 82.

NORTHWESTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Boise 2-Meter Net members assisted the sheriffs with communications during the Idaho City forest fire. Nampa hams assisted police with powerful lights and portable generators while searching for a drowning victim's body. K7KBU set up a "fire watch station" on 3945 kc. during the extremely dry summer, for vacationing mobiles to report forest fires. The Boise and Nampa 2-Meter groups meet Sun. for transmitter hunts. Sponsoring events at the W1MU Hamfest are the Shelley Tubers, Valley, Teton Valley, Magic Valley and Pocatello Amateur Radio Clubs, and Idaho radio amateurs. The St. Anthony c.d. group provided a monitor station. Officers of the 1960 W1MU are DWE, presy; JFA, veep and Helen, GGV, secy. K7LGQ has a new baby girl, Lois, K7JIK, got a complete ham rig as a wedding gift. New hams in Pocatello are brothers John K7NMLJ and Steve K7NMLK. FARM net traffic: 18. Traffic: K7KBJ 7 25, W7VQC 17, JFA 10, ZRQ 5, DHL 4, GGV 4, LIQ 4.

MONTANA—SCM, Vernon L. Phillips, W7NPV/WX1—SEC: KUH, PAM: YHS, RM: K7AEZ. The MPN meets on Mon.-Wed.-Fri. at 1800 on 3910 kc. TSN meets Mon. through Fri. at 1200 on 7225 kc. MSN meets Tue.-Thurs.-Sat. on 3530 kc. W7SFK, of Brady, is your new SCM. Registered attendance at the Glacier House was 456. Ham picnics were held at Lewistown and Fishtail. Amateurs throughout the State supplied communications during one of the worst sieges of forest and range fires
(Continued on page 130)

from **EICO**®... a completely new

CITIZENS BAND TRANSCEIVER

that meets
FCC regulations*

*EICO premounts, prewires, pretunes, and seals the ENTIRE transmitter oscillator circuit to conform with FCC regulations (Section 19.71 subdivision d). EICO thus gives you the transceiver in kit form that you can build and put on the air without the supervision of a Commercial Radio-Telephone Licensee!

#760:
117 VAC
Kit
\$59.95
Wired
\$89.95



Kit \$69.95
Wired \$99.95
#761: 117 VAC & 6 VDC
#762: 117 VAC & 12 VDC
incl. mtg. bracket (Pat. Pend.)

designed
by Hams...
for Hams...

to the highest
Ham standards

Highly sensitive, selective SUPERHET (not regenerative) receiver with 5½ dual function tubes and RF stage. Continuous tuning over all 23 bands. Exclusive Super-Hush® noise limiter. AVC. 3" x 5" PM speaker. Detachable ceramic mike. 5 Watt xtal-controlled transmitter. Variable "pi" network matches most popular antennas. 12-position Posi-Lock® mounting bracket. 7 tubes and 1 xtal (extra xtals available). Covers up to 20 miles. License available to any citizen over 18 — no exams or special skills required; application form supplied free. Antennas optional.

Additional crystals \$3.95 each.

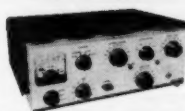
Most EICO distributors offer budget terms.



NEW! 60-WATT CW TRANSMITTER #723
Kit \$49.95 Wired \$79.95
Ideal for novice or advanced ham needing low-power, stand-by rig. 60W CW, 50W external plate modulation. 80 through 10 meters.



COLOR & MONO DC-5MC LAB & TV 5° OSCILLOSCOPE #460
Kit \$79.95 Wired \$129.50
5° PUSH-PULL OSCILLOSCOPE #425 Kit \$44.95 Wired \$79.95



90-WATT CW TRANSMITTER* #720 Kit \$79.95 Wired \$119.95
*U. S. Pat. No. D-184,776
"Top quality" — ELECTRONIC KITS GUIDE. Ideal for veteran or novice. 90W CW, 65W external plate modulation. 80 through 10 meters.



PEAK-TO-PEAK VTVM #232
Kit \$29.95 Wired \$49.95
VACUUM TUBE VOLTMETER #221
Kit \$25.95 Wired \$39.95



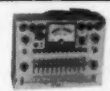
HIGH-LEVEL UNIVERSAL MODULATOR-DRIVER #730
Kit \$49.95 Wired \$79.95
Delivers 50W undistorted audio. Modulates transmitters having RF inputs up to 100W. Unique over-modulation indicator. Cover E-5 \$4.50.



RF SIGNAL GENERATOR #324
(150kc-435mc) Kit \$26.95 Wired \$39.95
TV-FM SWEEP GENERATOR & MARKER #368
Kit \$69.95 Wired \$119.95



GRID DIP METER #710
Kit \$29.95 Wired \$49.95
Includes complete set of coils for full band coverage. Continuous coverage 400 kc to 250 mc. 500 ua meter.



DYNAMIC CONDUCTANCE TUBE & TRANSISTOR TESTER #666
Kit \$69.95 Wired \$109.95
TUBE TESTER #825
Kit \$34.95 Wired \$49.95

EICO®

33-00 Northern Blvd.,
Long Island City 1, N. Y.

EICO, 33-00 N. Blvd., L.I.C. 1, N.Y.
Show me how to save 50% on 72 models of top-quality: ☐ Ham Gear ☐ Test Instruments ☐ Hi-Fi ☐ Send free Short Course for Novice License. Send free catalog and name of neighborhood EICO distributor.

Name..... Q5-10
Address.....
City..... Zone..... State.....
Add 5% in the West.

THE NEW P_H LA-400-C 800 WATTS PEP SSB LINEAR AMPLIFIER



**NOW 800 WATTS PEP
FOR ONLY \$164.95
THE "BEST BUY" YET**

NEW modern styling! NEW high efficiency 3 element band-switching pi net. Puts more power into any antenna or load from 50-70 ohms. For SSB, DSB, Linear AM, PM, CW and FSK. All bands 80-10 meters. May be driven to 800 WATTS PEP SSB with popular 100 watt SSB exciters. Uses four modified 1625's in grounded grid. On customers order, will be furnished with 837's. (note: 1625's and 837's are not directly interchangeable, since sockets are different.) Typical P&H Low Z untuned input. TVI suppressed. Parasitic Free. Meter reads grid drive, plate current, RF amps output. Heavy duty power supply using 816's. NEW modernistic grey cabinet measures approx. 9" x 15" x 10 1/2". Panel is recessed. **WANT TO SAVE MONEY? BUY IT IN KIT FORM.** It's a breeze to assemble and wire. **BEFORE YOU BUY — SEE THE NEW LA-400-C AT YOUR DEALERS.**

LA-400-C Kit complete with tubes.....\$164.95
LA-400-C Wired and Tested.....\$219.95

P & H ELECTRONICS INC.
424 Columbia Lafayette, Ind.

QUAD

- Single RG8U feed line if desired
- 10-15-20 meter bands
- Cast aluminum alloy and center spiders
- Aluminum boom with hard wood insert
- Pre-tuned reflector coils—no tuning
- Bamboo spreaders will withstand terrific wind velocity
- Weight—less than 30 lbs.
- High gain and F/B ratio
- Large "area" factor
- References: "Ask any ham who owns one."

Descriptive Literature Upon Request

Ask about the all aluminum, fully weatherproof quad

SKYLANE PRODUCTS

406 Bon Air Ave.

Tampa 10, Florida

in the State's history. YRC amateurs furnished communications during the annual Sports Car Races. CQC was seriously injured in a motorcycle-truck accident. VLY had a series of heart attacks. PYZ is critically ill. PRH is in the hospital. DWR and NOZ have a new jr. operator. OGT has a new baby girl. COH moved from Missoula to Stevensville. INM moved from Harlowton to Enterprise, Ore. K7BKH made BPL for the 13th consecutive month. New calls: K7LEL at Glasgow AFB. K7MRZ at Butte. K7GKH at Billings. KNTMOW at Laurel and KNTMOY at Great Falls. Thanks for all the cooperation during the past four years. 73, gang. Traffic: K7DCI 287, BKH 219, DCH 14, W7IDK 6, K7DNV 4, W7YQZ 3, NPV 2.

OREGON—SCM, Hubert R. McNally, W7JDX—The Oregon gang rendered swell service during the recent forest fires in the northeastern part of the State. A special report will be made giving details and listing those participating. Thanks, gang, for the swell job. GUH really is working at his OO job. LT traded an NC 173 for a 188D. K7JBQ handled traffic for the Boy Scout Jamboree in Colorado. No fishing in the Rogue River? K7EPO is back after a long period of rebuilding. ZB has a new mobile but his traffic totals are down. Could be too much driving, Don? There is a new AREC Net on 50.55 Mc. in Washington County. K7JSJ is working with JIP on 10.000 Mc. and perhaps there will be some new records soon. K7DVK is busy on 6 meters. A nice report was received from the OSN mgr. which shows the summer slump has finally hit but all old-timers seem to be holding things up. The SCM seems to be licking the buritis and should be getting around the country a little more. The PARC is lining up swell programs for members. The OEN Picnic at Medford was a big success, as were the ones held by the Portland Club Council and the OHMS. Hope more of you will send in cards and dope on your activity. Let's make this column larger. Traffic: (July) W7IDU 336, ZB 300, MW 68, ZFL 45, K7EPO 24, W7DEM 17, K7JBQ 15, W7LT 14, MTW 14, DIC 13, GUH 13, K7JWY 12. (June) W7ZB 246.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Over one hundred fifty attended the Washington Amateur Radio Traffic System (WARTS) Picnic at Lake Wentachee. LFA was M.C. and in charge of the registrations. K7AJT was elected manager for the coming year, with K7CHP as asst. mgr. and GSF as net secy. A new Novice in Burlington is KNTMQF. K7EY has a new SX-101 and a DX-100. The Totem Net (Seattle) on 29 Mc. has a new SX-101 and an DX-100. The Totem Net (Seattle) on 29 Mc. has 43 AREC members with 18 mobiles. BSW is looking for a Viking KW. APS is taking a vacation. AMC complains of the long hot summer days and is looking for rain. K7MFF, ex-K8MTK, is working portable out of Forks. AHQ, from Anacortes, joined the ranks of Silent Keys on July 13. LFA is using a new home-brew transistor power supply on his mobile. K7EPO is QRL pouring cement for the new ham shack. TH, from Walla Walla, says that ham radio played a big part during the forest fire in the Blue Mountains. MCU and K7DYL both have new towers and beams in operation. K7BXG remodeled his shack and has a nice set-up now. OMO, in Warden, says conditions are very bad at his location. K7EVI works for the NP Railroad. K6NFR/7 has a new Valiant. K7CWO has a new 20-A. VPW received the RBE Award at the WARTS Picnic. K7BBW is very active on 40 meters. K7ELH is mobilizing with a new Elmac receiver and transmitter. AIB converted his Hy-Gain Tribander to the new Thunderbird model. K7MAX is a new General Class licensee in the Poulsoho Area. FBI is planning on a new QTH in the Bremerton Area. DDL and DJV are going mobile. CW is QRL on board boat race official. EVU, RGL, RZO, NCC, HXE, IKM and HNV provided communications for the boat races at Poulsoho on July 4. ZCE renewed his EC certificate. K7CHH has three to go for DXCC. K7HZN still is chasing bugs in the DX-100. K7HSX has a new NC-109. The Franklin County AREC did the communications for the parade and boat races in the Pasco Area. The Spokane AREC holds regular hidden transmitter hunts the 2nd Tue. of each month. The Pierce County AREC forces were called out for a surprise test run. UMJ is going to 2 meters. VLC was home from Annapolis on a 40-day leave. The AREC Forum is scheduled to start on Sept. 23 at 1800 PST on 3970 kc. and will meet thereafter on the last Sun. of each month. The SCM and SEC attended the WARTS gathering at Lake Wenatchee. The SEC, along with WHV, then covered the entire southern end of the State on recruiting duty for AREC members. IYU now has an XYL. QLH is back home from college at Michigan State. Traffic: W7BA 804, DZX 562, K7EY 373, W7IST 341, APS 97, AMC 53, QLH 33, K7AJT 33, CWQ 20, W7GYF 14, K7MFF 7 13, W7PPW 9, BTK 3, LFA 8, W7FO 8, AIB 7, EBU 5, K7ASY 3, W7IEU 3, K7DDQ 2, CHH 1.

(Continued on page 132)



CRYSTALS

AMATEUR TYPES

H-43 or H73 low drift fundamental oscillator crystals. Will withstand high drive conditions.

1800 to 3000 kc ± 2 kc	\$2.95
3000 to 9000 kc ± 5 kc	2.95
9000 to 15000 kc ± 10 kc	3.95

Type H173 plated, high stability oscillator crystals.

1800 to 3000 kc ± 2 kc	\$4.95
3000 to 9000 kc ± 5 kc	4.95
9000 to 21 mc ± 10 kc	4.95
21 mc to 40 mc ± 15 kc	4.95
40 mc to 54 mc ± 25 kc	5.95
54 mc to 75 mc ± 100 kc	7.95

Special close tolerance crystals for the amateur.*

H43 or H73 1800 kc to 18 mc	\$4.80
H173 1800 kc to 75 mc	7.95

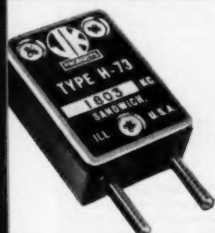
MARINE CRYSTALS

Type H-4 or H-7 marine tolerance high drive crystals.

Frequency range 2 mc to 7 mc \$4.95

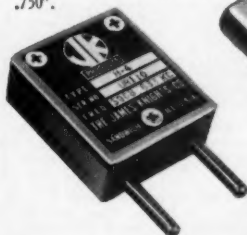
AIRCRAFT CRYSTALS

All types available. State holder size, pin dimensions, and spacing, equipment model and manufacturer, crystal frequency and channel frequency. If receiver, specify IF frequency.

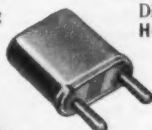


H-73 or H-7 (FT-243).
Pin Dia. .093" Pin Spacing .500".

H-43 or H-4 (HC-1/U).
Pin Dia. .125" Pin Spacing .750".



H-173 or H-17 (HC-6/U). Pin Dia. .050". Pin Spacing .486".
H-17L (HC-6/U Except .093" Pin Dia.)
H-17W (HC-6/U With Wire Leads)



H-3 (HC-18/U Except .039" Pin Dia.) Pin Spacing .192".
H-3W (HC-18/U) With Wire Leads

H-17T (HC-13/U). Pin Dia. .050". Pin Spacing .486".
H-17TL (HC-13/U Except .093" Pin Dia.)

CITIZENS BAND

Standard Transmitter Crystals. Type H-17 (HC-6/U) 50 mmfd load, .005% tolerance. Crystal on any FCC channel frequency. \$2.00

Standard Receiver Crystals. Type H-17 (HC-6/U), 50 mmfd load. Crystal 455 KC lower than FCC channel frequency. $\pm .005\%$ tolerance. \$2.00

Special Transmitter Crystals. Type H-17 (HC-6/U), H-3 with pins, or H3W (HC-18/U) with wire leads. Any practical load, crystal on $\frac{1}{2}$ or $\frac{1}{3}$ FCC channel frequency. Give holder, load, frequency, and make of equipment. Also includes control frequencies of 26.995, 27.045, 27.095, 27.145, 27.195, and 27.255 MC. $\pm .005\%$ tolerance. \$2.95

Special Receiver Crystals. Same holders and loads as special transmitter crystals but crystal frequency for IF other than 455 KC lower than channel frequency. Give holder, crystal frequency, load, IF frequency, and make of equipment. $\pm .005\%$ tolerance. \$2.95

MARS AND CAP

Type H-7 available on assigned frequencies. Calibrated to $\pm .005\%$.

Frequency Range 2 mc to 10 mc \$4.80

TV & MARKER CRYSTALS

Calibrated $\pm .005\%$	
Type H7, 3 mc to 18 mc	\$4.80
Type H17, 4 mc to 30 mc	7.95
Type H17, 3579.545 kc	4.80
Type H173, 1000 kc	7.95
Type H17TL, 100 kc	6.95

All prices postage paid. Send cash, check, or M.O. No COD's. Distributor inquiries invited.

THE JAMES KNIGHTS COMPANY

Sandwich, Illinois

SAVE 2 WAYS

**Barker & Williamson
Central Electronics
Collins
Cushcraft
R. L. Drake
Elmac
Genset
Hallicrafters
Hammarlund
E. F. Johnson
Mosley
National
P & H
RME**



Art Brown, W9IHZ

We are able to offer full market value for trade-in ham equipment in almost every instance. You are thus able to equip your shack with the most modern ham equipment without penalty. The dollars allowed in trade are just as big as the dollars paid in cash. In the case of contract sales your trade-in allowance provides a substantial equity at once while serving as the down payment. In the few rare cases where the amount of goods offered in trade is too great or where we are loaded on a specific item, the only loss is the postage.

A second way to save is by buying top flight used gear. We have been both surprised and pleased by the fine care evidenced by the more expensive trade-in receivers and transmitters. In many cases the performance, upon receipt, is as good as the day the equipment left the factory. Here too, we can trade at very realistic figures. The new owner's cost, however, is markedly reduced by reason of the previous owner's use. We don't have every item available used but now that we have all the top ham lines the variety is improving daily. Simply ask for our used list.

Coupled with the best possible trades and time payment terms with low down payments and reasonable carrying charges we offer our convenient Request for Quote form below. If you will complete it and drop it in the mail, our reply will be prompt and our trade-in offer fair. DO IT TODAY.

REQUEST FOR QUOTATION

(Please Print)

I have the following used gear to trade: (Please use this code to describe it.) 3. Like new, little use; 4. Minor signs of use, no major blemishes; 5. Good condition, with minor modifications; 6. Has major modifications, or requires major repairs

I am interested in purchasing the following equipment:

New ☐

Used ☐

No obligation to buy is implied.

Name: _____

Street No. or R.F.D.: _____

City: _____

State: _____

BROWN ELECTRONICS Inc.

1032 Broadway • Fort Wayne, Indiana
PHONE Anthony 3381

PACIFIC DIVISION

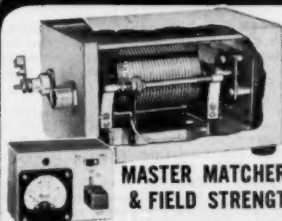
NEVADA—SCM, Charles A. Rhines, W7VIU—JU has his Mohican as a constant companion on all trips. YCT has a new mobile set-up. PWE is taking a tour of Europe. HOP has moved back to W6-Land, leaving us without an EC for Humboldt County. QHH is active with an ART-13 and is building 2-meter gear. JKV and KN7MNL, age 14, are new AREC members. YBY is recovering from surgery. SNP, the daughter of HJ, and K7IWT were married July 16. Congratulations. YNO, the son of VIU, is now at the Naval Communications Center at Cheltenham, Md. K7AGZ has returned from a vacation trip. BJR has moved to Las Vegas. John Kreiger has dropped the "N" and is now K7JW. KN7LFB had a fire in his shack. CWV is moving to W6-Land.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—VE2AGF spoke on Modern Miracles of Electronics at the August meeting of the NPEC. Each Tuesday and Thursday at 1930 the club sponsors a code school at 222 Alta Vista Dr., South San Francisco, the QTH of W6QIE. Here's a chance to learn or brush up on copy by stick or mill under ideal conditions. New officers of the Foothills ARS are: W6JKJ, pres.; K6TCH, vice-pres.; K6JKG, secy.; K6TJC, treas.; W6ZWE, RO; K6MOB, dir. at large. Looks like a real live wire group for the new term. K6JU and W6AFC, of the SCARS, worked on a special 6-meter rig for a contest held in September. Frank Quement's High Sierra group operated W6NX/mule-mobile while on its annual trek into the back country. Ma Bell is transferring several OTs, including W6WGO, former SCM, Sacramento. Our section's loss is SV's gain. W6MXO recently moved to San Bruno and is back on the air with vertical. K6VQK is installing a Valiant, W6HRS is converting his final to three parallel 811-As and is studying for the Extra Class exam. K6ZCR is collecting parts for higher power. K6MZN, OO-I, is planning to use a crystal mixer and low-frequency oscillator method in the next FMT. W4OXO/6 had lots of help from Monterey hams in erecting a 75-ft. tower which wouldn't stay up. After the disaster enough parts were left to put her up 60 feet. A new appointee is W6LPL as OBS. Traffic: (July) W6RSY 815, K6ZCR 352, W6JCG 114, K6GZ 103, W6FON 68, K6DYX 64, W6DEF 49, W6YHM 47, W3MVK/6 27, W6ZLO 26, W6YBV 24, W6OII 21, W6AIT 13, W6PLG 10, K6YKG 5, W6HRS 2. (June) W6YHM 54, K6YKG 48, W6WX 8, K6TEH 5, W6JYJ 2.

EAST BAY—SCM, B. W. Southwell, W6OJW—K6KK is helping Boy Scouts to build a crystal receiver. W6WLI is leaving the section to return to Sacramento. W6CFA visited W6NBX and will move to the section while attending U. C. W6CBF was in the Phone CD Party. W6IFZ, with K6OSO at the key, made 10,000 points in the CD Party. The MDARC held a picnic July 24. K6UFG won the RARC construction contest. W6MHJ is a new General in Berkeley. RARC made 2094 points in the Field Day activity. K6ZBG is working on super-duper d.f. receivers. K6MVS and his XYL have a new YL harmonic. K6ZBW has a new 1-kw. linear with a pair of 812s and built a 500-watt mobile rig. W6URH has a new 4-1000A linear. K6UTV built a Heath Mohican transistor receiver. W6EJA is in the hospital. Get well soon, OM. A new Novice is W6VMAQ, the XYL of W6HGO. W3WAU/6 and his XYL have a new harmonic. W6BRD built a transistorized grid-dipper. K6TWB has a new Chevy for his mobile rig. W6GUM has a new HRO in-haler. K6LGE was bitten by the 2-meter bug. K6AHW has left the section. The MDARC had a good turnout for Field Day. W6JYZ is moving to the Sacramento Valley section. W6MGE is a new Technician at the Dixon V.O.A. station. W6MAO is the new call of the BAY-LARC. W6FKN still is trying to get his ART-13 going, and has been working 6-meter mobile with a Heath receiver. W6AFLC is working 6 meters with a Heath. W6OJW is knocking off a few new ones on 14-Mc. a.b. Now is the time to check over your antennas for that winter DX. Let's have those reports by the first of each month. Traffic: (July) W6NBX 362, K6GK 150, K6OSO 105, W6OT 38, W6CBF 1. (June) W6IFZ 19, K6OSO 12, K6ESZ 7.

SACRAMENTO VALLEY—SCM, Jon J. O'Brien, W6GDO—Asst. SCM: William van de Kamp, W6CKV. Many RAMS participated in the Pony Express Centennial Celebration, with stations located all along the route between Sacramento and State Line. W6GTG and W6ADGH are spending two months in Baltimore. All club reports indicate Field Day was the best ever. The boys from Willows, W6KUI, K6KGH and K6BIQ, walked away with 2nd, 3rd and 4th prizes, in that order, at the GEARS Field Day event. W6JEQ is off to Korea for 45 days. W6DQI is having fun on 6 meters and has worked

(Continued on page 134)



6 or 12
volt models

Complete
\$24.95

Automatically
tunes entire
band by re-
mate control.

**MASTER MATCHER
& FIELD STRENGTH METER**



ULTRA-HI-"Q" COILS

**FOR 80, 40, 20,
& 15 METERS**

Your
Choice
\$5.25
ea.

The coil with the highest "Q" ever obtained.
Tested and found to have a "Q" of well over
515. Use with 36" base sect. 60" whip. 3" Dia.

**NEW!
SLIM-JIM**
ALL-BAND
BASE LOADING
ANTENNA COIL

96"
WHIP

FOR 10, 11,
15, 20, 40, 80
METERS

SIZE 1 1/4" X 19"

Positive action,
just slide whip
in or out to
loading point
and lock nut
into position.

NO.
B-1080
\$17.95

MULTI-BAND ANTENNA COILS

New Plug-in type coils, designed to operate with
std. 3' base and 5' whip.



NO. 900
10-15-20-40-75

• Rigidly tested & engineered—found to have
"Q" of 525 • Handles 500 Watts input
• Operates into a 52-ohm cable • Positive
contact—noise-free, trouble-free operation
• Weathersealed • Factory pre-tuned—no ad-
justments needed. **YOUR CHOICE EA \$14.95**

NO. 999
10-15-20 MET

NO. SSB-156
40 & 75 M.

**FIBRE-GLAS
WHIPS**

The Feather-
Weight Antenna
with Spring-Steel
Strength! Completely
weather proof,
breakproof ant-
enna with
special flexibili-
ty that prevents
accidental short-
ing-out against
overhead ob-
structions which
can cause loss of
signal, serious
damage to equip-
ment.

FG-60 60" \$4.95
FG-72 72" \$4.95
FG-84 84" \$5.15
FG-96 96" \$5.25
FG-103 103" \$6.95



**Leaders in the Design and Manufacturing of
Communication Equipment & Antennas
FOR LAND, SEA AND AIR**

**MONOPOLE
ANTENNA**

Folded radiating
element for in-
stallation requir-
ing a ground
plane configura-
tion and a wider
useful range.

11 Met. \$24.50
10 Met. 24.50
8 Met. 16.95
2 Met. 14.95

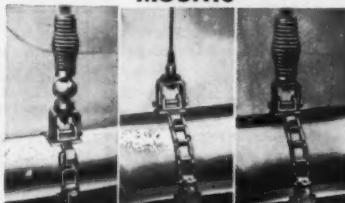


**3 ELEMENT 11M. BEAM
NO. SR-500**

Provides a power gain of
approx. 5 (7DB)
in forward direction.
10 to 1 inter-
ference reduction from sides
and rear. VSWR-1.1 to 1 at band
center when fed with 52 OHM coax. . . **\$36.00**

THE CITIZEN
SR.

MOUNTS



No.444 \$17.80 No.445 \$7.95 No.446 \$13.45
Adjustable to any bumper. No holes to drill.

**11M. CITIZEN
BAND ANTENNA**

40" base loaded
S.S. whip antenna.
Fitted with a 1/2"
dia. brass plug for
all-purpose
mounts. Low
standing-wave ra-
tio on most of
band when fed
with a 52 ohm
coax.

8B-27 \$12.95

**CITIZEN BAND
ANTENNA**

26.960-27.225
MC

VSWR under 1.5:1
at resonance. Com-
plete with 50' RG
58/U Cable. Swivel
type antenna
base for flat or
peaked roof
installation.

GP 27-11
\$34.50



**MASTER-MAGIC
WAND**

New easy-to-install, sin-
gle band, top-loaded
plastic covered fiber
glass antenna provides
maximum performance
at the most useful ra-
diation frequencies.

10 Met.- 5 Ft. L. \$8.95
11 Met.- 5 Ft. L. 8.95
11 Met.-35 In. L. 8.95
11 Met.-45 In. L. 8.95
15 Met.- 5 Ft. L. 8.95
20 Met.- 5 Ft. L. 8.95
40 Met.- 6 Ft. L. 9.95
80 Met.- 6 Ft. L. 9.95

**SKYMASTER
COAX ANTENNA**

Gets your signal
through where others
fail. Concentrates
signals at the lowest
angle, provides
omni-directional pat-
tern for best cover-
age. Matches RG
59/U Cable. SM-700
11 Met. . . \$17.95
10 Met. . . 17.95
6 Met. . . 15.95
2 Met. . . 10.95



MOUNT

Smaller version of
Master Mobile Mounts,
less spring. Swivels,
mounts in all positions.
3/8"-24 thread for
Magic Wand, and all
Master Antennas.

No. J-11 **\$2.95**

**WRITE FOR FREE
CATALOG**

All products are for Universal Use-Mobile, Home,
Marine, C.A.P., Civil Defense, Emergency, etc.



Master Mobile Mounts, Inc.

4125 W. JEFFERSON BLVD. • LOS ANGELES 16, CALIF.

**AT LEADING
RADIO JOBBERS
EVERYWHERE**



it's all in the delivery . . .

A. BARRY ELECTRONICS . . . delivery begins the minute the order is received. More than 35 technically trained personnel are ready to serve you. Whether it's a tube, receiver, transformer, capacitor — meter — or "X" band microwave components or equipment . . . we're ready to deliver.

Try us and prove to yourself . . . that it's all in the delivery.

SPECIAL: VHF xmt'r. Perfect for 2 meter and/or 1 1/4 meter conversion. Late, modern design. Uses (2) 6201s into single Amperex 6360 twin tetrode. Xmt'r only 4" x 4" x 11". Only 3 3/4 lbs. Complete with 10 1/2" chrome antenna, and A & B Battery pack (water activated), connection cable, and conversion info. **\$15.00**

IN STOCK: Hammarlund HQ-100C, -110C, and -145C. Brand new sealed factory stock. Write for Trade-In deal.

BRAND NEW JOHNSON MESSENGER. (Complete 23 channel citizens band coverage). Write for brochure.

CORNELL-DUBILIER MODEL AR-22 ROTATOR with automatic type control unit. Handles antennas up to 150 lbs. Mounts on mast, tower or platform. Takes masts from 3/4" to 2" O.D. Complete with rotor control unit and instructions. Operates on 115 volts, 50/60 CPS. **\$32.77**

HEAVY DUTY PROP-PITCH MOTOR (80 lbs.) **\$35.00** F.o.b. Ga.

SEE THE U.S.A. OR THE WORLD IN 3-D: Plastic relief maps in beautiful color. Self-framed, ready to hang. Beautiful, accurate. 28 1/2" x 18 1/2" at **\$9.95**; 26" x 41" at **\$24.95**; 42" x 63", **\$49.95**. Specify U.S.A. or World Map. Brochure available.

Prices F.o.b. N.Y.C. except Prop-Pitch Motor. Factory Authorized distributor for: Adjust-A-Volt, Akro Parts Cabinets, Ameco, B&W, Burgess, Central Electronics, Cornell-Dubilier, Drake, Glas-Line, Hammarlund, E. F. Johnson, National Radio Co., Vibroplex, Sonotone.

WRITE FOR YOUR COPY OF OUR CATALOG TODAY (Full of Specials on Gear, Tubes, Components, Etc.)

BARRY ELECTRONICS CORP.

512 Broadway Dept. Q-10 New York 12, N.Y.

SSB

Improve your Mileage and Readability under bad Conditions

100V TRANSMITTER

Output: 100w SSB, PEP; CW; 40w AM

Pat'd Broadband ckt. — only one tuning control — the VFO

Also the Complete CENTRAL ELECTRONICS SSB line

- MM2 'SCOPE. Monitors your own and the other fellow's signals. Kite or W&T.
- 10B, 20A Exciters, VFO's, Slicers, Kite or W&T.
- RME RECEIVERS, CDR ROTATORS, Tri-Ex, Spaulding, Aeromotor Towers.
- TELREX — the best in beams.
- CESCO — 10, 15, 20M Fiberglass Quad.

Write for Bulletin "Getting Started" and "Stepping Up" in SSB. Give call letters.

SAVE MONEY BY MAIL. Order from W9ADN at

ORGANS & ELECTRONICS Box 117, Lockport, Ill.

8 western states. W6AF is taking an auto trip through the Northwest and east to Illinois. Summer vacations are being enjoyed by many local hams with camping heading up the list of ways to spend those vacations. That is all this time; no traffic reports were received.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—A High Noon Net has been started in Stockton to promote 6-meter activities. It is held each Mon.-Fri. on 50.25 Mc. from 1200-1400 local time. K6HIX is working 6-meter mobile. New Novices in Stockton are W6KEJ, W6KUJ and W6LUX. W6BXD got his Technician Class license. K6AVA got his General Class license. K6ROU and K6OZL gave each other competition in the CD Party. W6RRN has a 30-watt rig on 6 meters. K6EUY has a new HQ-110. W6BTK has a new v.f.o. for his Challenger. W6BXH is building a 6-meter receiver for mobile. K6OBY is on the mend, no longer on the crutch. W6FUF, after reading page 62 of Feb. QST, joined the Naval Reserve! W6IHE is heard on 75-meter a.s.b. K6IXA is heard on 75-meter a.s.b. W6DEA is operating 75-meter phone. W6UBK has trouble with DX stations calling him when he calls CQ using his rhombic on 20 meters. He says there are too many of 'em. W6XV is thinking of a high-power final amplifier for his 100V. W6VW is looking for more activity on the 100 net on Tue. nights, 146.8 Mc. at 8 p.m. W6OVR has a new Gonset. W6BST is on RTTY. W6PJF is on a.s.b. every morning. K7LCAK has a 2-meter Gonset and is located in Stockton. W6AIA is operating 20-meter a.s.b. from K7LFAR. An old friend of mine, and I'm sure a good friend of you, W6QK, has joined the list of Silent Keys. Now that the vacations are over, let's have some activity and some news from you guys. Traffic: K6ROU 117.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—PAM: DRC. V.H.F. PAM: ACM. RM: PNM. The Winston-Salem amateurs took part in a Highway Safety Program that proved very successful. They cooperated with the local Civic Clubs and the law enforcement officials. Communication was maintained via a 2-meter RACES set-up. Congratulations. PNM is getting out an excellent NCN Bulletin each month and is doing an excellent job with the c.w. portion of our section net. 3JWN/4 made BPL and K4DWU made it in June. Ronnie originated 100 messages; Pete originated 37 plus 59 deliveries. Congratulations, fellows. A nice report was received from BBZ, who has his rig all packed to move to Florida. He is being transferred to Jacksonville. We are sorry to see Ellis move but we wish him the best of everything in the future. A short training program is being carried out each Mon. evening on the Tar Heel Emergency Net, 3865 kc. at 1930. Changes in District One of the Army MARS program is noted. RVH is now the new District Director. RRRH has been promoted to assistant to the Third Army MARS Director in charge of Education and Training. To the many fellows applying for ORS, be patient. I will send certificates along just as soon as I receive a supply. BPL cards are being sent. Many of you are eligible but fail to make a report. You must have a total of 500 messages, or 100 originations, or a total of 100 originations plus deliveries, either c.w. or phone. Traffic: (July) W3JWN/4 238. (June) K4DWU 133.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. RM: K4AVU. PAM: K4HIE. The Mike and Key Club of Greenville now has 23 active members; the latest addition is KN4TPJ. The club hopes for WAS on Field Day contacts. Other clubs reporting on Field Day activities are the Spartanburg ARC, the Palmetto RC of Columbia, the Cheraw ARC, the Rock Hill RC and the Barnwell Mike and Key Club. New club officers in Barnwell, with Barney at the helm, are GOJ, vice-pres.; K4VVE, secy.; and OFF, act. mgr. K4PIA was married to JIR on Aug. 28. K4HDX, VVE and ZHV, of SCN, are new ORS. The DX RC of Camden held a picnic at Kershaw State Park Aug. 28. K4JPT was very busy publicizing the affair on the phone net. The Rock Hill ARC has made elaborate plans and preparations for the annual hamfest to be held at Joslin Park Oct. 9. On Oct. 8, prior to this hamfest, a supper meeting will be held of League Officials, net managers, NCSs and net members to coordinate and discuss net activities in the State; also to have reports on c.d. and RACES, which are under the direction of K4HIL. UMW, business manager of *Scrab* has a new rig on the air. Traffic: K4ZHV 282, HDX 110, AVU 76, W4V1W 18.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—SEC: K4MJZ. PAM: BGP. RM: K4JKK, K4KNP, SHJ, K4QER, K4EKL and QDY. Your SCM attended the Graveyard Net Picnic on July 10 and the Fifth Annual Roanoke Hamfest on July 22 and 24 but missed the VFN Picnic at Bonney Lake on July 31. The VFN elected K4DCN as manager and K4LTO as asst. for the next

(Continued on page 138)

PENTA BEAM PENTODES

for higher power and better linearity at lower plate voltages



PL-172



PL-175A



PL-4E27A



PL-177A

Here are four beam pentodes for linear amplifier service—giving you higher power output at lower plate voltages, with minimum distortion. The PL-177A is for 50-watt to 200-watt peak output service. The PL-4E27A delivers up to 280 watts of usable power output. The PL-172, a 1000-watt external-anode tube, features the exclusive Penta vane-type suppressor grid which makes possible extra efficiency and linearity. The PL-175A, a 400-watt tube, is designed to replace the 4-400A directly and provide substantially more output with no circuit or voltage changes.



RATINGS

Type	FILAMENT		Max. Plate Dissipation (Watts)	USEFUL OUTPUT* CLASS-AB ₁ LINEAR AMPLIFIER Plate voltage in volts				
	Voltage (Volts)	Current (Amps)		1000	1500	2000	2500	3000
PL-177A	6.0	3.3	75	96W	140W	210W	—	—
PL-4E27A	5.0	7.5	125	—	—	220W	280W	—
PL-175A	5.0	14.5	400	—	—	445W	570W	680W
PL-172	6.0	7.8	1000	—	—	1020W	1280W	1540W

*Actual power output delivered to load from typical amplifier.

ASK FOR A FREE COPY of "Transmitting Tubes for Linear Amplifier Service." This nine-page bulletin discusses linear amplifier tube requirements in detail. Graphs, characteristic curves, oscillograph linearity patterns and data show why Penta's exclusive beam pentode designs outperform four-element tubes.



PENTA Laboratories 312 North Nopal Street, Santa Barbara, Calif.

COMPLETE • CONVENIENT • ARRL LOG BOOK

It helps make the job of record keeping a pleasant one. Fully ruled with proper headings for all necessary entries, the Log Book not only helps you to comply with FCC regulations but also provides a lasting record of many pleasant QSOs.

Spiral bound, 39 pages
50¢ U. S. A. Proper
60¢ Elsewhere

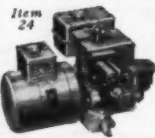
in Looseleaf form (3-hole)
100 sheets — \$1.00

(postpaid anywhere)

The American Radio Relay League
West Hartford 7, Conn.

"The World's THRIFTIEST Light Plants"

Have a steady, dependable 115 v. of AC electricity for receivers, transmitters, antenna motors, emergency lights, etc. . . . for radio amateurs, camps and Civil Defense . . . at DIRECT-TO-YOU FACTORY PRICES! No wiring needed . . . just plug in.



Exclusive new ELECTRONIC BRAIN provides instant full power upon demand, holds thrifty idle otherwise. Slashes fuel cost . . . doubles engine life! Available on all our plants. Built by experts dedicated to bringing you a better product!

Model illustrated, our portable 700 watt plant. 2.3 H.P. easy-starting Briggs-Straton engine. Radio shielded, shock mounted . . . hams report less heat than on commercial power line. Complete with voltmeter and built-in winding to charge auto batteries. **\$143.50**
1200 Watt Plant (Item 45) same as item 24 but with larger generator and engine . . . 50% greater output **\$199.50**
If ELECTRONIC BRAIN desired, specify and add \$30.00.

We make all sizes to 100,000 Watts. Write for information.

Send 10¢ for Fig. New Catalog. Free with order.

Prices f.o.b. factory. Money back guarantee. Send check or m.o.

Master Mechanic Mfg. Co. Dept. I-610, Burlington, Wis.
Southern Customers Write Dept. I-610, Box 65, Sarasota, Fla.

season. BGP, the former manager, is doing two weeks of active duty at Ft. Belvoir. The brand-new Norfolk AREC had an outstanding drill on July 17; one dozen stations took part. The Tidewater Mobile Radio Club's Sunday transmitter hunts on 3835 kc. are open to every mobile in the area, according to K4LPR, our OPS and OO. EEU now is modifying his G4ZU beam. CXQ says "Traffic 147 this month and all I did was check in one night to ask K4JRK for a date with his sister." OOL reports that KN4WHJ dropped the "N" from his call. Pete also says the CD Party was FB and he worked both A1 and A3. K4QIX and PNK both have new QTHs. Larry says, "Mobilizing and hamfests are taking their toll of traffic time." Rog is not satisfied with his "low-flying antenna system" after a CD workout. K4DOR reports much MARS activity and keeps up a busy gas station, also. K4IIP is slowed down by a transfer to Richmond—he is home only once a week. K4ELG, a former top-scoring trafficker, complains about his low score but work comes first. PVA, from Manassas, is in the same boat. Hi, July usually is the low month of activity but the section as a whole has a healthy look. OO reports were received from BGP and K4LPR: OES from K4EUS. Traffic: (July) W4QDY 219, SHJ 208, ZMH 207, CXQ 147, GOL 142, K4MXF 91, QIX 61, SGO 37, FSS 35, W4DVT 28, BGP 26, K4SNS 21, W4AAD 19, K4IIP 14, W4OWV 12, ATQ 11, PRO 9, PNK/4 8, K4LPR 5, ELG 2, FMS 2. (June) K4SNS 16. (May) K4IIP 6.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—GIU has been appointed EC for Randolph County. K8GAP increased power to 800 watts on 3590 kc. and reports a new club is being organized in his area. KN8VIP received his license as a result of the East River ARC code and theory classes. MLX is now mobile with Gonset Twins. K4CQA/8 worked VR2DK on 7 Mc. with 75 watts to an indoor antenna. K8CSG has 60 watts on 6 meters and is very active in Kanawha County emergency work. K8JLF has finished the 150-watt rig and reports that KN8MBH, now K4THQ/5, is in the Air Force in Mississippi. The Huntington Western Net meets 1900 each Mon. on 50.55 Mc. K8HID, c.w. net manager, reports stations up 60 per cent and a 4 per cent increase in traffic. K8BIT now is operating RTTY. K8AEN worked ELAA on 7 Mc. K8JSX reports K8SQH, K8EYS and K8QMU are on 50 Mc. in the Kanawha Valley with activity high. K8PJC wonders if he is the youngest General in W. Va. NYH is active in phone net traffic work. The Blennerhassett ARC held a very successful picnic at Parkersburg July 31. K8PCF is active on 6 meters from Parkersburg. K8BLR is back on v.h.f. from a new QTH in St. Mary's. DPT and GAD are on 144 Mc. trying to work Kanawha Valley from Fairmont. Traffic: K8HID 33, W8NYH 28, K8JLF 18, CSG 7, W8ELX 6, K8JSX 4, PJC 2.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Carl L. Smith, W8BWJ—Asst. SCM: Howard S. Eldridge, K0DCW. SEC: NIT. RMs: WME and MYB. PAMS: CXW and IJR. OBS: DCC. A new RM was appointed July 17 at the DRC Hamfest Traffic Meeting. He is MYB, replacing K8EDK, whose resignation was accepted under protest. The DRC Hamfest was a huge success, with W8ESP winning the Collins 758-1 and AJH the Hallcrafters TO keyer. A tip of the hat to IA, who has been the NCS for the Colorado WX Net each day, Mon. through Sat. for so many consecutive years. It was rather discouraging for Colorado traffic-handlers to be so ignored by the group at KBBSA during the Scout Jamboree. Seems that the use of the NTS was unheard of, at least on a section level. AREC membership in Colorado has been growing lately because of the able work of NIT, our SEC, and the following ECs: W8 DQN, DWE, GDC, KQD, NUU, NVU, NVX, OMN, PGX, PXX, SFS, SIN, UPS, VSM, YMP, K8s BOH, CEN, CEZ, COL, DXF, EGI and FVN. A wonderful time was had by all participating hams at the International Pack Burro Race on July 31. Ham radio got a lot of fine publicity, both locally and nationally, from its coverage of this event. Congrats to WME on his new 100V. K8DNP has gone into the Navy, but his mother is soon to take over the r. f. output from Palmer Lake. Traffic: (July) K8EDH 37, W8QD 28, K8EDK 29, W8WME 186, K0DCW 60, W8MYB 58, K8TMM 46, QGO 24, EVG 12, W8CBI 3. (June) W8KQD 108.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, OCX. SEC (acting): QWH. RM: OCX. V.H.F. PAM: SP. There are quite a few appointments to be filled. If you are interested in one, please contact the SCM. The UARC (Salt Lake) had its annual hamfest in Parley's Canyon. KTDVT won a v.h.f. receiver. K7CUU won a 75-watt transmitter. K7BXX has asked to be relieved of her duties as NCS on BUN. Arline has done a real fine job. Thanks for a job well

(Continued on page 138)

**"CALL ME
for
Personal Service"**

Bob Henry
W6ARA
Butler, Mo.
ORchard 9-3127



**"CALL ME
for
Personal Service"**

Ted Henry
W6UOU
Los Angeles
GRanite 7-6701



OPEN OCT. 1—
THE 3rd
HENRY RADIO STORE
931 N. Euclid Ave.,
Anaheim, Calif.

ON

WORLD'S BEST TERMS

*Because we
finance our
own terms . . .*

- Only 8% a year finance cost
- 20 months or longer to pay
- Only 10% down (or your trade-in as down payment)
- No finance charges if paid within 90 days
- Reduced charges if paid off ahead of time
- You get more flexibility of financing in the future (such as re-financing) because we handle our own financing

A-1 Reconditioned Apparatus

Nearly all makes and models. Big savings!
Ten day trial—90 day warranty. 90 day full
trade back on new apparatus. Write for
bulletin.

Collins
S/LINE



KWM-2 Transceiver	\$1150.00
32S-1 Transmitter	666.00
516F-2 AC Power Supply	115.00
516E-1 12V DC Power Supply	270.00
75S-1 Receiver	520.00
312B-3 Speaker	29.00
312B-4 Speaker Console	195.00
30S-1 Linear Amplifier	1556.00

Write, phone or visit either store today!

Inquiries and orders from military men and others outside USA wanted

Butler 1, Missouri

ORchard 9-3127

Henry Radio Stores

11240 West Olympic Blvd.

Los Angeles 64 Ph. GRanite 7-6701

BIG

TRADE-INS

"World's Largest Distributors of Short Wave Receivers"

Modern Power



BURGESS BATTERIES

CHROME PROTECTED
SEALED-IN-STEEL
SELF RECHARGEABLE
GUARANTEED LEAKPROOF



Radar-Lite

CORROSION PROOF
separated head and
battery design

BURGESS BATTERY COMPANY

DIVISION OF SERVEL, INC.
FREEPORT, ILLINOIS • NIAGARA FALLS, CANADA

mars

IMPORTED —
7 x 3 x 2½



measurement of either 52 or 75 OHM Coax. Can remain in line at all times. Operates 160-2 meters.

SEE YOUR DEALER OR FOR DETAILS WRITE

PAUSAN COMPANY / SAN RAFAEL, CALIF.

AMATEUR EQUIPMENT

STANDING WAVE
INDICATOR

\$17.95

Fully Guaranteed

Takes full kilowatt.
Switching allows

done. The time has come to nominate for division director and vice-director. See QST for information. Please send any news you may have to the SCM. BUN is doing pretty well despite the bad summer conditions. Traffic: W7OCX 223, QWH 2.

FIRST UTAH QSO PARTY

October 1 and 2

The Utah Amateur Radio Club is sponsoring the first Utah QSO Party so that amateurs the world over may have a chance to work a "rare" Utah station.

This is not a contest but an attempt to have as many amateurs from Utah on the air as possible so that many stations may complete their WAS. Starting time is 1800 MST October 1 to 2359 MST Oct. 2 (0100 GMT Oct. 2 to 0659 Oct. 3). All QSL cards must be sent to station contacted.

NEW MEXICO—SCM, Newell F. Greene, K5QL—

Asst. SCM: Carl W. Franz, 3ZHN. SEC: CIN. PAM: ZU. 10-meter PAM: LQM. V.H.F. PAM: FPB. RM: ZHN. Until Oct. 1, the Breakfast Club will meet Mon. through Sat. at 0630 MST on 3835 kc. The NMEPN meets Sun. at 0700, Tue. and Thur. at 1800. The NMBP meets Mon., Wed. and Fri. at 1900 MST on 7060 kc. The TWN meets daily at 2000 on 7060 kc. ZUV/M, with members of the Grotto Club, were exploring caves when they spotted a forest fire in the hills. NMEPN was convening at the time, so the information was quickly relayed to authorities. The Sun. session of the NMEPN has an average QNI of 25 per session covering a vast area. Mobiles in any part of the section can be heard and boosted in, if necessary. K5TQP, working hard to get established on 144 Mc. in New Mexico, now has a 100-ft. tower at home and a 70-ft. tower at his mountain location. Traffic: W3ZHN 464, K5GOJ 63, IPK 41, W5UBW 11, K5DAB 8, RHR 8, LWN 7, DAA 5, W5VC 3, CIN 1.

WYOMING—SCM, Lial D. Branson, W7AMU—SEC:

CQL. The Pony Express Net meets Sun. at 0800 MST on 3920 kc.; the Wyoming Jackalope Net meets Mon. through Fri. at 1200 MST on 7255 kc. for traffic. The YO Net is a c.w. net on Mon., Wed. and Fri. at 1830 MST on 3610 kc. There was a large turnout at the Wyoming Hamfest July 16 and 17 at the Pines Lodge, west of Buffalo. Several out-of-State hams attended, including 9FM, of Illinois, and his XYL. ARRL Rocky Mountain Division Director IC was present and gave a very nice talk during the banquet. He also demonstrated how to send c.w. on the hot seat key. The Casper Radio Club held a very nice Field Day on top of Casper Mountain using the club call VNJ and made a large score, using the club's stand-by light plant. Traffic: W7BHR 12, ABO 6, AMU 5, HH 4, K7GMD 3, LIL 3, W7LKQ 3, CQX 2, K7IAY 2, JLO 2, W7HHW 1.

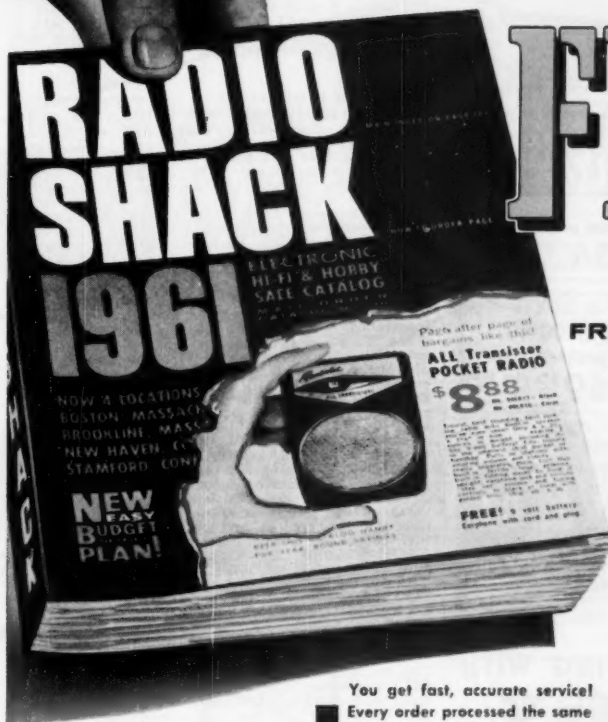
SOUTHEASTERN DIVISION

ALABAMA—SCM, William D. Dotherow, K4AOZ—

SEC: JDA. RMs: RLG and OCV. PAMs: PHH, BTO and JJJ. AUP would like to hear from anyone interested in reactivating the Alabama QSO Parties. GYW has a new Gonset KW linear amplifier. Congrats to DFE on appointment as RACES Officer for Jefferson County. K4PHH would like all CD appointees to join in on the CD Parties. K4GOW reports that much traffic is being passed without a "check." If it's worth sending, it's worth a "check!" K4WI is back from pres. of K4SMF. Fort Bragg on Army Reserve duty. BTO changed the mobile from 6 to 12 volts. AYU has moved to Virginia. K4HJM reports two more AREC mobiles in Anniston. Welcome to AENB K4AOZ, K4JSO Decatur, K4UFL Piedmont, K4SAV and RLG were highest QNI on AENB in July. MLU is in Oklahoma for the summer. K4CZK and K4SAV invite all stations with traffic to check in to AENT on 3905 kc. at 1830 CST daily. PTR scored 82,700 points in the recent C.W. CD Party and reports moving to Boston. K4KJD reports that KN4YWO and KN4ZGB are new hams in Athens. K4AUP reports that VYI and his family moved to California. RQS now is sporting a Collins KWM-2, a 30S-1, a 312B-5 and a CE MM-2 scope. PKA, EC, reports new officers of the Decatur ARC: K4JSL pres., KN4WHV, vice-pres., K4SMF secy., BFM, treas., K4UEC and BFM, asst. Ec. K4UEE has moved to KR6-Land and says, "Thanks, everyone, for a wonderful stay in K4-Land." K4RM now is at Georgia Tech. Six Meter News: JJJ reports a new v.h.f. emergency net, AENY, with members in Mont-

(Continued on page 140)

Don't miss it! A million have sent for it already! Send for your copy of Radio Shack's new 1961 Electronics CATALOG



FREE

Plus a full year's FREE SUBSCRIPTION to all other Radio Shack Catalogs as issued

Save up to 50% all year long on the latest and best items in the whole fascinating field of Electronics.

See the world's biggest line of Stereo, Hi-Fi, Ham Radio, Transistors, Test Equipment, Kits and Parts, scores more.

You get fast, accurate service!
☐ Every order processed the same day received. No delays!

☐ You can pay as you earn on Radio Shack's Easy Budget Plan. Low as \$2.00 down.

☐ You can open a convenient Monthly Charge Account. "Add-on" orders are easy.

GUARANTEE

Radio Shack guarantees your absolute satisfaction or your money back. 15-day no-risk home trial on any item you order.



RADIO SHACK
 Corporation

730 Commonwealth Avenue
 Boston 17, Massachusetts

MAIL COUPON TODAY

RADIO SHACK CORPORATION Dept. 60K 11
 730 Commonwealth Ave., Boston 17, Massachusetts

Without obligation, send your latest Electronics Catalog plus every new issue, hot off the press, for one full year, free and postpaid.

Name

Address

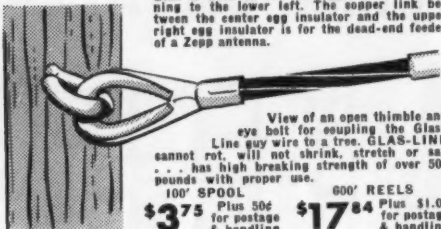
Post Office Zone State

NON-METALLIC GUY LINE - PERFECT FLEXIBLE INSULATOR - REVOLUTIONIZES HAM RADIO & TV ANTENNA SYSTEMS

Non-inductive, non-conducting, non-absorbing Glas-Line isolates systems from directional arrays, rhombics, etc.



The new main insulator of W3UCT. The Glas-Line is between the two egg insulators running to the lower left. The copper link between the center egg insulator and the upper right egg insulator is for the dead-end feeder of a Zepp antenna.



View of an open thimble and eye bolt for coupling the Glas-Line guy wire to a tree. GLAS-LINE cannot rot, will not shrink, stretch or sag... has high breaking strength of over 500 pounds with proper use.

100' SPOOL \$3.75 Plus 50¢ for postage & handling
600' REELS \$17.84 Plus \$1.00 for postage & handling

'SUPER' GLAS-LINE with 1,000 lb. TENSILE STRENGTH with proper use.

100' SPOOL \$6.95 Plus \$1.00 for postage & handling
600' REELS \$34.75 Plus \$2.00 for postage & handling

Announcing New "G-3 50X GLAS-LINE CABLE" with 2,500 lb. TENSILE STRENGTH with proper use.

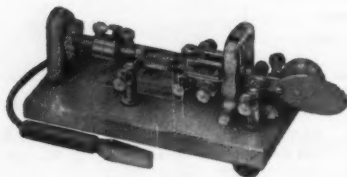
100' SPOOL \$13.90 Plus \$1.50 for postage & handling
600' REELS \$69.50 Plus \$3.00 for postage & handling

Send check or M.O. No C.O.D.'s please.
DEALER & DISTRIBUTOR INQUIRIES INVITED.

THE GLAS-LINE CO.

2751 Nostrand Ave., Dept. 2, Brooklyn 10, N. Y. CL 2-9851

ENJOY EASIER SENDING WITH VIBROPLEX SEMI-AUTOMATIC



No matter how good an operator you are, the smooth and easy operating Vibroplex takes all the labor out of sending. Never tires the arm, never upsets the nerves. The choice of experts everywhere, Vibroplex with its attractive appearance and its precision machining gives long life even under rough usage. Adjustable to any speed and comes in five models, standard or deluxe. Priced from \$15.95 to \$29.95. Order today from your dealer's or direct.

THE VIBROPLEX CO., INC.

833 Broadway New York 3, N. Y.

FREE Folder

gomery, Clanton, Selma, Talladega, Troy, Childersburg and Prattville. The manager is IRT and the net meets Tue. and Fri. at 8 p.m. on 50.250 Mc. NCSs will be K4ZXA and IRT. A commendable fact noted at the organizational meeting was that 7 of the 11 present had General Class licenses. K4EFM and CIN hold daily skeds with Marietta, Ga., and Atlanta stations for propagation checks. MWF, K4KAM, ZUP, KACNA and VYF now are on 6 meters. K4UMD has a new Elmac AF-68 and is NCS on AENO Mon. nights. K4MEQ has 30 states confirmed on 6 meters. CIN is building an s.s.b. rig for 6 meters. K4YGS is building a 6- and 2-meter rig. K4JSP installed a 30-watt home-brew mobile rig in the car. Traffic: (July) W4RLG 137, K4PFM 113, SAV 109, W4PTR 81, K1X 30, PVG 30, CIU 27, K4AOZ 26, PHH 26, CZK 22, W4MI 21, ZRQ 18, K4JDA 17, UEE 16, AAU 15, BTO 14, BFT 12, HVN 11, GOW 10, HJM 9, W4DGH 7, K4AAQ 6, W4WHW 6, K4HFX 5, UMD 5, TDJ 4, ZBX 4, ZNI 4, RIL 2, YGS 2, YTR 2, RIX 1. (June) K4UEE 51, W4PVG 30, K4RJM 27, HVN 9, RSB 7, YGS 7, W4JXX 2, K4MEQ 2, UMD 2. (May) K4UEE 19, RSB 12.

EASTERN FLORIDA—SCM, John F. Porter, W4KGJ—SEC, IYT, RM: K4SJH, PAM: SDR, V.H.F. PAM: RMU. New officers of the Tampa ARC are K4LM, pres.; GMJ, vice-pres.; K4EQH, sec.; CL, treas.; DDM, GLZ KRC, Turrentine and Wilkerson, directors. The Hillsborough County AREC/RACES group was on the job during the floods-in and around the Tampa Bay Area. This organization has come a long way under the leadership of K4YOQ, EC and Radio Officer. K4SJH, our RM, is responsible for a great deal of work on our nets during July. He has operated from the Boy Scout Camp at Sebring from the 24th to the 30th, handling over 187 pieces. Some of the many that helped to get the traffic on its way were LDF, ZPO, AKB, CNZ, NDJ, AHZ and K4s BLM, TDT, EHY, JZJ and LQS. Thanks also to the net control stations for their fine cooperation. The Broward ARC participated in Gold Coast Marathon again this year. K4RNS received the second Certificate Hunters Club certificate given to a YL. This makes 81 for Marge. Net manager of the Florida Sidebanders is CNZ. With all the new mobiles on the road these days we should have one of the best set-ups for emergency communications in the South. How about some of you new amateurs with gear signing up with your local AREC organization and giving them a helping hand? After all, fellows, amateur radio exists as a hobby because of its service rendered in times of disaster when all other means of communications fail. Ragchewing is fine but a percentage of your time should be devoted to some sort of public service. There is no better place than in the AREC and RACES. We had one BPLer this month and a total traffic of 235. Traffic: (July) K4SJH 657, LCF 239, KDN 230, LCD 185, BY 180, W4SDR 164, AKC 163, K4EHY 125, TDT 85, W4GJI 58, TRS 57, K4DBT 46, MTP 45, W4CNZ 42, K4DAX 39, BOO 37, YOQ 35, W4EHW 33, K4AKQ 32, RNS 32, ODS 23, W4EAT 14, SGY 14. (June) W4JRJ 28.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: HKK, PAM: K4RZF, RM: UBR, Field Day in N. W. Florida found clubs from Tallahassee (YUU), Panama City (K4FDS), Pensacola (K4ALI), Eglin AFB (SRX) and Thomasville, Ga. (UCJ) operating. The PCARC had the most contacts, but the TARC had the high score. Steinhatchee: UZB is the new EC for Dixie County. Perry: KQP and K4FTG arranged for your SCM to visit a number of hams while in town, including ZWY and K4NJH. Tallahassee: TDT is in school at F.S.U. K4PVT, CHZ and YUU have left college. MJE is finishing a new transmitter. K9EDJ is the A.F. teletype maintenance man for the North Florida Area. CMG has moved here from Georgia and lives next door to K4VLE. MLE made WAS 50 between Apr. 1 and May 17. Quincy: SYMO has moved here to work for a gas pipeline outfit. Marianna: K4TTY, AIA, K4CDU, PHV, RII, RZE, SZH and K4ZTQ are active on 10-meter phone. Madison: PBO will be on 6 meters soon. KN4VOK has received his ticket but is moving to Kansas. Defuniak: HQN's XYL received the call OSD. Eglin AFB: Local hams are taking part in several drills conducted by Air Force and county c.d. officials. Gulf Breeze: K4ZMV is now ORS and OBS. Pensacola: Parascities has gone high class, with photos and a new format. K4WQV and Editor K4SMI have the summer mailing list to all of Western Florida. Traffic: (July) K4CNY 358, UBR 149, W4MLE 71. (June) K4BSS/4 160.

WEST INDIES—SCM, William Werner, KP4DJ—SEC: AAA, ATK, Ramey AFB, joined the AREC. KL7CQL/KP4 is on s.s.b. from Urb. Universidad with a 10A plus linear, Drake 2A and a Tribander beam. AAA, in the same neighborhood, has a new HQ-170. AAN's 50-Mc. antenna has 20 elements on a 36-ft. (Continued on page 142)

BULLSEYE BUYS at ARROW!

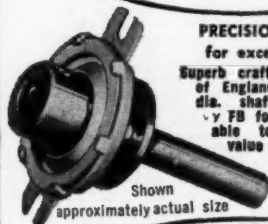
HAMMARLUND HX-500 100 W SSB Transmitter



- For amateur and commercial use on the 3.5, 7, 14, 21 and 28 to 30 MCs band.
- Separate dial scale for each band, or portion of 10 Δ band. All crystals included for all amateur bands—nothing extra to buy.
- Frequency readability to 200 CPS, or better.
- Stability after warm-up better than 100 CPS.
- 50 ohm fixed pi output. T.V.I. suppressed, VOX & ANT-VOX control conveniently located on front panel.

AMATEUR NET
695⁰⁰

PRECISION PLANETARY-VERNIER for exceptionally fine tuning



Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, $\frac{1}{4}$ " dia. shaft, $1\frac{1}{2}$ " long, 6:1 ratio, $\frac{1}{2}$ V.F. for fine tuning. Easily adaptable to any shaft. Comparable value — \$5.99.

Amateur Net \$1.50 ea.
10 for \$13.50

Shown
approximately actual size



"Wonder Bar" 10 Meter Antenna

As featured in Nov. 1956 QST. Complete with B & W 3013 Miniductor. Only 8 ft. long for 10 meters. Wt. 5 lbs.

Amateur Net **\$7.05**



Versatile Miniature Transformer

Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x $\frac{3}{4}$ " w. x $\frac{3}{4}$ " d. New and fully shielded.

Amateur Net \$1.39 10 for \$10.75

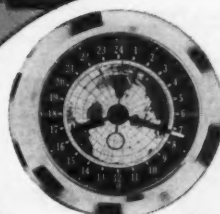
3 for \$3.49
ARROW Authorized distributor of HEATHKIT equipment

EQUIPMENT COVERS



Heavy gauge, clear plastic, similar in gauge to \$35 to \$50 plastic auto seat covers.

- | | | |
|---------|---|--------|
| AS-1001 | Fits HQ-145, HQ-170, HQ-180 and NC-303 | \$4.70 |
| AS-1002 | Fits HQ-100 and HQ-110 | \$3.70 |
| AS-1003 | Fits NC-109 and NC-188 | \$3.90 |
| AS-1004 | Fits Hallicrafters SX-100, SX-110, SX-111 and S-108 | \$4.65 |
| AS-1005 | Fits Hallicrafters SX-101 and SX-101A | \$4.95 |

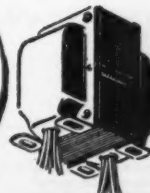


24 HOUR CLOCK

24 hr. chrome plated 8" metal wall clock. Inner dial with south polar projection map of world indicates time around world. Polar projection dial adjustable for various time zones. Shpg. wt. 2 lbs.

Amateur net \$8.47
tax inc.

220V. 50 cycle model.....9.95



NEW, STANCOR C-1412 FILTER CHOKE

4 hy., 250 ma., cased filter choke. 3,000 V insulation. DC resistance 60 ohms. 3" x 3" x $3\frac{1}{2}$ ". Shipping weight 5 lbs.

Reg. 6.96

195

MAIL ORDERS PROMPTLY PROCESSED
SAME DAY SHIPMENT FROM STOCK

ARROW  ELECTRONICS, INC.

65 Cortlandt Street, New York 7, N. Y. • Dlgby 9-4730
525 Jericho Turnpike, Mineola, N. Y. • Pioneer 6-8686

Send for FREE Amateur Catalog

TO SAVE C.O.D. CHARGES, PLEASE INCLUDE SUFFICIENT POSTAGE WITH YOUR ORDER. ANY EXTRA MONEY WILL BE RETURNED.

ALL PRICES F.O.B. N. Y. C.
Arrow's Export Dept. Ships To All Parts Of The World!
Prices Subject To Change Without Notice.



pi-network coils provide complete line



Model 851
\$16.50

Model 850A
\$35.00

Model 852
\$39.50

Now—Pi-Network inductors specially tailored for your needs. Here are highly-efficient, super compact tank coils incorporating the unique feature of integral band switching.

Model 850A and Model 852, now complement the famous B&W Model 851. All are designed for single or parallel tube operation on 80, 40, 20, 15, 11 or 10 meters, with top efficiency in Class "C" or linear operation. Windings give ample current carrying capacity with optimum "Q" over the entire operating range.

See these superior B&W inductors at your dealers now, or write B&W direct for detailed information.



Barker & Williamson, Inc.

Canal Street & Beaver Dam Road
Bristol, Penna.

Improve your fist... with



AUTRONIC Keyer and Key

- Approved for Gov't. tests

AUTRONIC KEYER — Compact portable keyer is fully transistorized... no tubes... no relays. Sends precisely proportioned, self-completing dots, dashes and spaces. Eliminates erratic sending. Speed is instantly variable by single knob adjustment. Attractive unbreakable plastic case may be placed in any position.

AUTRONIC KEY — Send faster, easier reading CW. New velvet touch working mechanism. Silver alloy contacts. Twin paddles for right or left handers. Adjustable for right "feel." Properly weighted, will not walk. Built for lifetime use. See your dealer or order direct. 10 day money-back guarantee.

KEY \$16.95 • KEYER \$69.50
(Plus postage)

ELECTROPHYSICS CORP.

2500 West Coast Highway
Newport Beach, California
Since 1929

Send
your QSL
or post card
for free
descriptive
folder.

boom 60 feet high. AAN has a G50, a G66 and a 51J-RME converter combination. AVB has a Heath Sixer in the Volkswagen using a Saturn Halo antenna. DJ worked 25 KP4 stations and two K4s in Miami in two weeks on 6 meters with a Heath Sixer. CA, CK, AAB, ACH and AOD have ordered Heath Sixers. AAB will use a Heath Sixer in the car and plans a Saturn Halo atop a tall building for 6 and 2 meters. AVB, AAB and DJ have Sixers crystal-controlled on 50.125, 50.150 and 50.180 Mc., respectively. The PRARC is purchasing two Heath Sixers with vibrator power supplies and Saturn Halo antennas to be loaned to club members to stimulate 6-meter interest and to provide two mobile units for emergency operation. These will be raffled off at the Annual Hamfest. Election, W3DVT/KP4 operated on 6 meters while on vacation here. DJ is building a 50-Mc. six-element beam on a 24-ft. boom. ALX, ALL and ART are on 50 Mc. from Arcibo. AMJ from Vega Baja and AHF from Manati, CK rearranged the equipment in the shack and wound up with only the 6-meter gear working. ALY has 50 confirmed on 50 Mc. for the WPR-50 Award. AIS is building an 81A linear for h.f. and uses a Seneca on v.h.f. AEA uses a Challenger and an HQ-170 with an eight-element beam on 50 Mc. ASN is on 6 meters with a TBS-50 and a five-element beam. Old-timer AY is back on 20, 40 and 6 meters with a Globe Scout Deluxe. An HQ-170 and a Telrex six-element beam for 50 Mc. Old-timer CU built a 6-meter rig for his daughter which he now uses. JM ordered a CE 100V. AMU, our very efficient OO, has transferred to the state. K4, expecting ham in Bayamon, is planning 6-meter operation. CO2XZ, Havana, is testing with CK, AAN and ALD crossband 144 to 50 Mc. AVO is going mobile on 6 meters. SV swapped the Heath Sixer for a Gonset G50. AVB ordered a PolyComm 6-2 v.h.f. transceiver. AMG is off to Bolivia to make a microwave survey for IT&T. AMG installed a mechanical filter in the 73A-2 and has assembled a few linear using 4-250As. K4, in a new QTH at Las Americas, K1ALR, ex-KP4FF, vacationed here before a 13-month tour of duty in Korea. ALR is a major in the Signal Corp. AAN, ALY and AOD, in Rio Piedras, each have emergency power plants and are close to State Civil Defense Hq. Civil Defense Director Mercado Reveron has been appointed to a new post by the Governor. DY accepted the job of editor of PRARC Ground Wave. DJ and HZ are planning a committee for the island-wide "Worked KP4 Contest" to be sponsored by the PRARC. Stations holding official appointments who do not return the questionnaire mailed to them will be cancelled. Active stations who are ARRL members are urged to apply for appointment as OO, ORS, OPS, QES or OBS. QSL Manager K4D reminds KP4s expecting QSL cards via the bureau to file self-addressed stamped envelope with him. Please report your activity to the SCM the first of each month. Traffic: KP4WT 63.

CANAL ZONE—SCM, Ralph E. Harvey, KZ5RV—After Field Day the amateur bands seemed to drop away to nothing in the tropics and from the few contacts with various amateurs the doldrums seem to be universal. Past observations show that the sun-spot cycle is on the wane and we can expect conditions to be very poor for the next several years. There have been several new additions to the ranks of the Canal Zone amateurs, among them Major General O'Connor, chief of staff, who has been active for over thirty years and now has a Canal Zone license. Also during the month of July a number of amateurs left the Canal Zone for new assignments. Among these were BS, US, AH, EM, KC, MN and TT. We hear by the grapevine that Bill Cobb, ex-KC, had a heart attack the day that he arrived at his new station. We hope that he is well on the road to recovery by the time this appears in print. At the July meeting of the CZARA KQ showed a movie of life in Newfoundland. All present enjoyed the show. Traffic: KZ5JW 101, UR 30, VR 21, CC 11, RM 6.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, Jr., W6JQB—SEC: W6LIP, RMs: W6BHG and K6HLR. PAMs: W6BUK and W6ORS. The following stations earned BPL in July. W6ZJB, K6MCA, K6WAH, W6WPF, W6GYH and W6EEO. Congrats, fellows! New officers of the San Gabriel Valley Radio Club are W6ZPM, pres., W6ORS, 1st vice-pres.; K6VJT, 2nd vice-pres.; K6PFY, secy.; W6KXU, treas. Just heard that W6AKS had another jr. operator! W6DFT, operator at K6WAH, has a new Mohawk and an HT-32A. W6EEO is recovering from eye surgery. Glad to have you back, Larry! The SoCal 6 Net did a bang-up job serving the Salvation Army Disaster Communications during the San Gabriel fire. New officers of the Downey Amateur Radio Club are K6MSL, pres., K6HQ, 1st vice-pres.; K6ICQ, secy.; W6UFJ, treas. W6DCF passed the radio-telephone 1st-class exam! W6EBK got the mobile rig installed in the new family chariot! W6NAA, W6BFC, (Continued on page 144)

NO TRAPS in the New Doublet Antennas

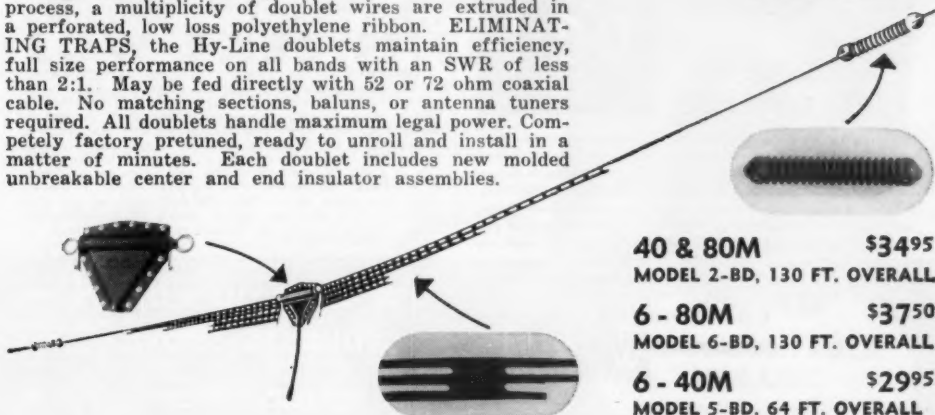


Says Leo I. Meyerson,
WØGFQ



Hy-Line Multiband Doublets

Through the use of a unique and exclusive new patented process, a multiplicity of doublet wires are extruded in a perforated, low loss polyethylene ribbon. **ELIMINATING TRAPS**, the Hy-Line doublets maintain efficiency, full size performance on all bands with an SWR of less than 2:1. May be fed directly with 52 or 72 ohm coaxial cable. No matching sections, baluns, or antenna tuners required. All doublets handle maximum legal power. Completely factory pretuned, ready to unroll and install in a matter of minutes. Each doublet includes new molded unbreakable center and end insulator assemblies.



40 & 80M \$34⁹⁵
MODEL 2-BD, 130 FT. OVERALL

6 - 80M \$37⁵⁰
MODEL 6-BD, 130 FT. OVERALL

6 - 40M \$29⁹⁵
MODEL 5-BD, 64 FT. OVERALL

6 - 20M \$21⁹⁵
MODEL 4-BD, 32 FT. OVERALL

Center Insulator \$3⁹⁵
MODEL CI, WT. 6 OZ.

End Insulator \$1⁰⁰
MODEL EI, WT. 2 1/2 OZ.

VHF BANDS NOW OPENING UP...

CHECK THESE LATE HY-GAIN MODELS

2M, 5 ELEMENT \$8⁹⁵
BOOM 5' 4" — ELEMENT 41 3/4"

2M, 10 ELEMENT \$14⁹⁵
BOOM 12 FT. — ELEMENT 41 3/4"

1 1/4 M, 11 ELEMENT \$13⁹⁵
BOOM 12 FT. — ELEMENT 27"

3/4 M, 13 ELEMENT \$12⁹⁵
BOOM 8 FT. — ELEMENT 13 3/4"

Send for **Hy-Gain's** LATE FREE CATALOG

TOP RECONDITIONED EQUIPMENT SAVINGS

World Radio's fast turnover in Reconditioned Equipment allows us to make high offers for your present gear. Let us make you a quotation the next time you buy. We believe you will be (pleasantly) surprised.

SEND FOR LATEST FREE LISTS!

Silver Anniversary FREE CATALOG

Over 200 pgs. of excellent bargains for the novice, the technician and the advanced amateur. Fully illustrated. Includes the complete service story on World Radio. Send for your FREE copy now!



WRL

WORLD RADIO LABORATORIES

Q-10

3415 W. BROADWAY • PHONE 32 8-1851 • COUNCIL BLUFFS, IOWA

LEO: PLEASE SEND FREE CATALOG () • ENCLOSED IS MY CHECK FOR _____
FOR THE () 2-BD () 6-BD () 5-BD () 4-BD () CI INSULATOR
() EI INSULATOR () 25-VHF () 210-VHF () 111-VHF () 313-VHF

NAME: _____ CALL _____

ADDRESS: _____ CITY & STATE: _____



WEBSTER ELECTRIC Model 2D11

TRANSISTORIZED POWER CONVERTER

Here's an ideal unit for driving mobile receivers and transmitters where size and weight are important — where only 12-volt power supply is available. The Webster 2D11 Transistorized Power Converter is compact, sturdily built — produces up to 500 volts DC. No moving parts. Requires little if any maintenance. Automatic overload protection — a short in the load circuit stops the oscillator, reducing the output to zero without overload strain on parts or input source. Regulation exceeds that of mechanical converting equipment. 4" x 4" punched base for horizontal or vertical mounting.

COMPONENTS DIVISION

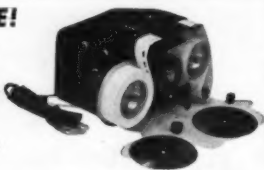
WEBSTER  ELECTRIC
RACINE · WIS

8173

LEARN CODE!

SPEED UP Your
RECEIVING
with C-C
Automatic Sender

Type 5
\$32.00 Postpaid in
U. S. A.



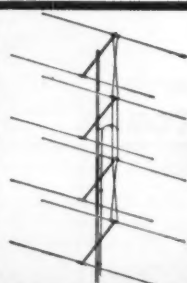
Housed in Aluminum Case, Black Instrument Finished. Small—Compact—Quiet induction type motor, 110 Volts—60 Cycles A.C.

Adjustable speed control, maintains constant speed at any setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

GARDINER & COMPANY

STRATFORD

NEW JERSEY



NEW

VHF

COLLINEAR ARRAYS

430 Mc. 16 El.	\$ 9.85
220 Mc. 16 El.	12.85
144 Mc. 16 El.	16.00

also available with
32 and 64 elements

SEE YOUR DISTRIBUTOR or
write for free catalog

CUSHCRAFT

621 HAYWARD ST.
MANCHESTER, N. H.

Dependable POWER up to 500V DC!

K6SIX and many others did a wonderful job on the fire emergency and the missing boy search. W6LRD has the new S-Line gear and received the DXCC Award. Congrats, Don! W6FB is moving to Palm Springs. K6LJY came out with "A" in summer school! K6GTG has a new twenty-element Spiralray beam on 2 meters! W6AM has returned from a nice trip through Russia. W6DWP hit 100 per cent attendance on SCN for the second month. Congrats, John! W6JOC has a new 40-ft. tower and a tri-band beam up. W6CIS is getting to stick around home for a few days! It is good to see W6CMN back among the reporters! Support your section nets: On phone the SoCal 6 Net meeting at 1900 PDT on 50.4 Mc.; on c.w. the Southern California Net meeting at 1900 PDT on 3600 kc. Both nets are on daily. Traffic: (July) W6ZJB 1120, K6MCA 892, K6WAH 765, W6WPF 713, W6GYH 708, K6CLS/6 496, K6OZJ 274, W6EEO 225, W6BHG 159, W6BFC 65, K6JSD 62, K6TPL 58, W6DWP 26, W6JOC 24, K6SIX 21, W6BUK 16, K6PZM 14, W6CMN 13, W6CK 12, K6COP 8, W6ORS 7, W6CIS 6, W6AHUO 5, W6NAA 5, W6AM 3, K6LJY 3, K6CDW 2, K6GTG 1. (June) W6EEO 212, K6ZJS 86, W6MLZ 40, K6JSD 29, K6TPL 23.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—SEC: CAF. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 7210 kc.; the Catalina Emergency Net Wed. at 2000 on 29.627 and 145.8 Mc.; the Tucson AREC Net Wed. at 1900 on 3880 kc. Three alerts kept Tucson fixed stations and mobile units busy in July. Working under the direction of Capt. Kenneth Sturgeon, and as an integral part of the Pima County Search and Rescue Unit, the Tucson group was called out on the 16th and again on the 22nd to search for children lost in the mountainous areas. Both children were found unharmed. On the 20th, in an all night effort, communications were furnished by the amateurs for fire-fighters battling blazes in the Kitt Peak Area. LAD, Civil Defense Radio Officer for Pima County, has announced that a RACES plan for Pima County has been approved. LVR is net control for the northern half of the county; UVR is net control for the southern half of the county. The Copper State Net extends best wishes to AMM, who recently transferred to Saudi Arabia. Ray Meyers, Southwestern Division Director, visited amateurs in Phoenix, Tucson and Ft. Huachuca in July. New calls: K7MFD, Phoenix; K7JTS and K7JTT, Flagstaff. New equipment: K7AEW, a home-brew cubical quad. Traffic: WTAMM 40.

SAN DIEGO—SCM, Don Stansifer, W6LRU—WA6-KGK, in Fullerton, operated during a Scout-O-Rama in Orange County. The Orange County RACES group is forming a club to be known as the Amateur Communications Club, so K6RCK reports. K6BTO has been able to get an APX-6 to operate on higher frequencies. W6HU, OO in Santa Ana, has been busy preparing for his daughter's marriage. W6CDD vacationed in W-land and Milwaukee and visited ex-K6EUE, of El Cajon, who is now K9DQW. The Fourth Annual South Bay Amateur Radio Society potluck was held in August. Those visiting from the Tijuana Radio Club were XE2s, AJ, KE, OO and OP. Ex-member K3JYZ (ex-K6BCG) also was present. W6IVB is building a new SSB amplifier. W6CAE vacationed in Northern California during August. W6FJD has moved to the top of Pt. Loma, a choice DX spot. W6BUX spent August in the High Sierra fishing and hiking. W6FAY was at the July meeting of the San Diego DX Club, held at the home of W6RCD. W6JH and his wife left in mid-August by jet for an extended vacation in Europe. W6XP vacationed in Oregon. W6BKZ vacationed in New York City. Traffic: W6YDK 1814, K6BPI 1057, W6CDD 759, K6LKD 296, W6ATB 151.

SANTA BARBARA—SCM, Robert A. Hemke, K6-CVR. There are more openings for League appointments. Let your SCM know and the appointment will be considered. Two-meter activity is picking up. W9KLR/6 is operating from Orcutt, K4RFP/6 and W6PMO/6 are operating out of Santa Maria. K6VDW is on daily at 2030 on 145.8 Mc. He has heard stations from Long Beach, which is all right from Grove City. New calls in the Santa Barbara Area are W6MBQ, W6MCW, W6VGM, W6MCT, W6AJAR, W6ATU, W6BHV and W6FGV. K6VWJ traded in his Conditional for a General Class ticket. W6HUT and K6ODE have some 420-Mc. equipment to experiment with. Anyone else interested, let W6HUT know. K5AOB/6 changed his QTH to Santa Barbara and is on 15 and 40 meters with a Globe Scout transmitter. W6HD has a new twin 8 antenna on 2 meters, plus a BC-6400 transmitter with 100 watts input. The Arroyo Grande Area amateurs named their club "RADIO," which means Radio Amateur Designers, Inventors and Operators. Traffic: K6VDW 4.

(Continued on page 146)

**AGAIN
AVAILABLE
AT**

HARVEY RADIO

TOROID LOW PASS FILTER

Low pass audio filter that contains 5 Toroidal coils in an L/C network — Pass band 300 to 2,500 cps \pm 3 DB — Extremely sharp cut off at 3,200 cycles — Impedance 600 ohm in and out...

Weights 3.6 lbs.
Dimensions: $3\frac{3}{8}" \times 3\frac{3}{8}" \times 5"$



- ▶ Handle up to 25 to 30 watts of audio
- ▶ No maintenance
- ▶ Better than a Speech Clipper

**AN UNBEATABLE
VALUE!
WORTH TWICE
THE PRICE**

You can put it to use in so many ways—

- ★ In single side band applications
- ★ In 500 ohm line from speech driver to modulator
- ★ In 500 ohm receiver output
- ★ As a telephone line filter for broadcast stations

**ONLY
\$9.95**

F.O.B. New York

Take advantage of this sensational below manufacturer's cost offer. It's the buy of a lifetime you can't afford to miss. Order by mail today.

Send check
or money order
inclusive of
shipping charges
to

**HARVEY RADIO
CO., INC.**

103 West 43rd Street, New York 36, New York

**wire this balun coil kit
to suit yourself
...it's easy!**



**Balun Coil Kit
Model 3976
\$8.95**

A brand new balun coil kit with exclusive B&W design features. Model 3976 has sturdy, air-wound bifilar inductors for multiband impedance matching.

Kit has full wiring instructions showing how to connect 75 ohms unbalanced to 300 ohms balanced, or 75 ohms unbalanced to 75 ohms balanced.

Balun operates on 80 through 10 meter bands without tuning or changing coils. Rated at 250 watts maximum AM phone, 500 watts CW and 1 KW on SSB.

Coils and space-saving mounting bracket also available separately.

Available at better dealers now, or write to B&W direct.

Barker & Williamson, Inc.
Canal Street & Beaver Dam Road
Bristol, Penna.

KTV TOWERS

are SAFE in winds up to 80 m.p.h.
Faster installation... much longer life.

- For Hams
- For Research at Schools
- For Geodetic Survey
- For Wind Measurements
- For Antenna Testing
- For Government Research

We also have heavier towers available for Communication work.

See ad page 110, August 1960 QST

SEND FOR ILLUSTRATED FOLDER

**KTV TOWER and COMMUNICATION
EQUIPMENT Company**

P.O. BOX 294 • SULLIVAN, ILLINOIS

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, 5NFO, SEC: K5AEX, PAM: BOO, RM: LR, Brownfield seems determined to stay in the news headlines, even the hard way. This time it was an explosion in a large grain elevator. This was the second large explosion in less than two years and as usual Brownfield amateurs were prepared to render assistance. NFO and K5GEC furnished emergency power plants to light the disaster area until local power was restored. K5EDJ, of Farwell, Tex., moved 200 yards west and is now a /5 in New Mexico. Little League ball and vacations are taking a toll in club attendance and other activities all over the section. Because of an increase in membership the North Texas Emergency Net now meets at 0730 on 3930 kc. instead of 0800. LGI is the new net manager for NTTN. KCQ was a visitor from Omaha and advised he expects to get his # call soon. K3GKV, ex-K5ASZ, brought his family back to Ft. Worth for a short visit and son Rickie was bitten by a rattlesnake. Thanks to quick action there were no ill effects. Ft. Worth mobiles have come up with a new pastime; all mobiles assemble at one place and get several fixed stations in various parts of town to give them signal strength readings as the mobile operators adjust rigs or antennas. It is very interesting and enlightening. Traffic: W5BKH 158, ACK 126, K5BKH 113, W5AYX 51, K5HTM 41, W5ASA 16, K5SKX 7, PVX 11.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—K5IBZ is a new ORS and K5OOV is a new OPS. The Okmulgee Club has a good group, active in AREC and RACES, and with a good activity program. K5MDH is the capable president. An interesting account in the *Collector and Emitter*, club paper of the Aeronautical Club of Oklahoma City, tells of K5JEA's experience in getting into Alaska with an emergency message. This is just another example of what radio amateurs can and will do. Thanks to K5UND for a newsy letter concerning the activities of the Jackson County Amateur Radio Club. New officers of the Muskogee Club are K5BPY, pres.; WAX, vice-pres.; KN5ADX, secy.-treas.; K5PRW, act. mgr. The July windstorm that swept through the State destroyed quite a number of antennas. Among the biggest losses were the antennas of DNG and EHC, who lost three. Glad to hear K5IXS, K5HEW, K6OVD/5 and AHD checking into the traffic nets. Official Bulletin Stations in all parts of Oklahoma transmit ARRL Official Bulletins regularly using all bands and all modes of transmission. Listen to the Official Bulletin every day. Traffic: K5IBZ 231, JGZ 172, W5OOF 147, K5DUT 118, CAT 104, TAJ 104, CAY 93, W5DRZ 86, K5QEP 69, DLP 55, W5WAX 43, K5AUX 41, OOV 37, RLG 36, CBA 29, W5WAF 27, K5LUR 21, JOA 20, W5KY 18, CCK 15, K5DJA 14, W5MFX 12, K5LZF 10, W5WDD 9, K5EZM 6, W5ADB 5, K5REH 3, W5VLW 3.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. D. Solomon, VE1OC, and H. C. Hillyard, VOICZ, SEC: BL. The 3rd World Scouting-Jamboree-on-the-Air will be held the week end of Oct. 21-23. Here is an opportunity to assist the Boy Scout groups in your area by letting them participate from your station. Why not contact local Scout Leaders for more information? Don't forget the Worked All Nova Scotia Award. Many Nova Scotia amateurs have been making DXpeditions to counties with little or no amateur activities to assist those who are working on their WNAS certificate. DB has moved to a new QTH. W9QNI/VO2 has been transferred to South Carolina and will be looking for VEs and VO's on 75 meters. Apologies for the short column this month. The writer has moved to a new QTH with the address changed to Harvey Station, N. B. Traffic: VE1OM 85, ADH 49, W9QNI/VO2 29.

ONTARIO—SCM, Richard W. Roberts, VE3NG—We have noticed with great satisfaction the many additional mobiles that are appearing each week. May we congratulate BZB, of Peterboro, on his recent appointment as manager of the ECN. OE is doing FB as OBS on s.s.b. RW has become a Silent Key. The Algoma RC had an FB Field Day turnout. The London Club members were hot-shots at Field Day. The v.h.f. boys had a dandy do in June at Toronto. WHHDQ was the guest. The Ontario Amateur Radio Assn. voted A. Page, pres.; T. Hunter, vice-pres.; A. Mean, secy.; J. W. Choc, asst. secy.; A. Benson, treas.; R. Parry, 2nd vice-pres. The Sarnia ARC had an FB article on safety in its bulletin. (Copies on request to its secretary.) The Hamilton ARC knocked them dead on Field Day. IB is recovering very rapidly and expects to be on the air soon. ADD, NG, DTO, LI, AQL, OE, ARF, ELC, DSM and CO are among the many on mobile these summer days. AEJ is

(Continued on page 148)

**NOW AT RADIO SHACK!
NEW LOW DOWN PAYMENTS
ON HALLICRAFTERS**



\$10 DOWN AT RADIO SHACK
HALLICRAFTERS
SX-111 RECEIVER **\$249⁵⁰**
\$17 monthly

No cash needed!



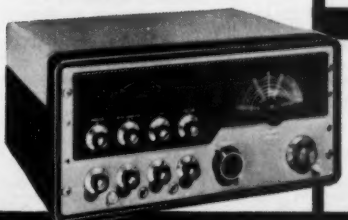
\$10 DOWN AT RADIO SHACK
HALLICRAFTERS
SX-101A RECEIVER **\$399⁵⁰**
\$25 monthly

Use Trade-in as Down Payment!



\$10 DOWN AT RADIO SHACK
HALLICRAFTERS NEW
HT-37 TRANSMITTER **\$450⁰⁰**
\$29 monthly

Low monthly payments!



\$15 DOWN AT RADIO SHACK
HALLICRAFTERS
HT-32A TRANSMITTER **\$695⁰⁰**
\$34 monthly

BIG "PLUS-20%" TRADE-INS ... MAIL COUPON TODAY!

**NOW 4 STORES
RADIO SHACK**

167 Washington St., Boston 8, Mass.
730 Commonwealth Ave., Boston 17, Mass.
230 Crown St., New Haven 10, Conn.
29 High Ridge Road, Stamford, Conn.

RADIO SHACK CORPORATION DEPT. 10D
730 COMMONWEALTH AVENUE, BOSTON 17, MASS.

Please quote an extra 20% allowance on my model _____

I would like to trade for the following HALLICRAFTERS

- | | |
|---|--|
| <input type="checkbox"/> HT-37 Transmitter @ \$450.00 | <input type="checkbox"/> SX-111 Receiver @ \$249.50 |
| <input type="checkbox"/> SX-101A Receiver @ \$399.50 | <input type="checkbox"/> HT-32A Transmitter @ \$695.00 |
| <input type="checkbox"/> Send Free Bargain Catalogs for one year | <input type="checkbox"/> Check |
| <input type="checkbox"/> Send 1960 Electronic Buying Guide, Free! | <input type="checkbox"/> Money Order |
| | <input type="checkbox"/> C.O.D. |

Name _____

Address _____

City _____ Zone _____ State _____



Emblem Decals



Attractive black and gold ARRL emblem decals are available to League members from Headquarters. They measure approximately 4 by 2 inches, will adhere to almost any surface, metal, glass, wood, plastic, and come complete with directions for applying. Use them to dress up your car, station equipment and shack. They're supplied at 10 cents each — no stamps, please — to cover costs.

AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Connecticut

NOW A 3-BAND . . . SINGLE FEEDLINE QUAD . . . by CUBEX

No relays, switches or matching devices required. Operate 10-15-20 meters with only one 52 or 72 ohm line, plus all the CUBEX MK III features at no increase in price. Only \$67.50 ready to install

HI GAIN • HI FRONT-TO-BACK RATIO • PRE-TUNED • NO STUBS • HUSKY CAST ALUM. SPIDERS • RUGGED 2" TUBULAR ALUM. BOOM • TV ROTOR TURNS • LARGE CAPTURE AREA • UNDER 30 LBS.

Write For Free Brochure "SF"
CUBEX COMPANY

3322 Tonia Avenue

Altadena, Calif.

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher**. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The **Instructograph Code Teacher** literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System**. Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS
4700 Crenshaw Blvd., Los Angeles 43, Calif.



vacationing in Eastern Ontario and W1-Land. DXZ is vacationing at Port Severn. CPR also is in the same area. DVG now is in the Rexdale Area near Toronto. DAR is going s.s.b. RG has an Apache. OE is RTTY, as is TL, BAD and TV. The Goderich gang held an FB picnic. Members of the Grey-Bruce Net were present. AUU and BZB were at Outlet Lake. Visitors were AIL and BAQ. AOE is a bee-keeper. CWA is a new net member on the ECN. IOM was a guest of BZB and AUU. He is a former SCM of the Maritime section. Boys to the east of Belleville are quiet this summer. Ottawa mobiles are busy at their cottages. *Correction:* In Aug. QST CMR was noted as rec. secy. of the Nottown ARC. This should have read CRM. Our apologies to both gentlemen. Traffic: VE3CWA 206, NG 91, BZB 85, AIL 78, DPO 73, AUU 65, BUR 51, BAQ 49, NO 27, CFR 25, EAM 25, DZA 20, OE 20, DWN 19, DTO 18, DXZ 16, KM 13, DH 5, ELC 3.

QUEBEC—SCM, C. W. Skarstedt, VE2DR-BK, while holidaying in U. K., held the call G3OGA and contacted AEL on s.s.b. This year the Boy Scouts again are holding a Jamboree with Hq. station VE3JAM at Ottawa. Join them by calling "CQ Jamboree." Dates: Oct. 22 and 23. Frequencies 3750, 7100, 14,175, 21,250 and 28,450. BK is the Quebec Coordinator and will be glad to supply further information. QC, back from Europe, reports he is World Representative for the International Ham Hop Club with headquarters in U. K. This organization promotes international friendship and arranges cost-free holiday lodgings for hams travelling in Europe. Following are the graduates from the 2nd C.J.O. code classes: BFR, BFP, BEZ, ASC, BER, BDZ, BDU and BDE. A new class started Sept. 24 and will comprise a 6-month course in code, theory and law. EA is "Centre des Experimentateurs Amateurs de V.H.F.," active on 144 Mc. during contests. Had the pleasure of meeting G500 (YU's father) at the Lakeshore Club meeting. Other DX visitors to VE2 were DL4QJ and SM5CZF. TA is back on the air after a long absence and uses an HT-4 and an AR-88. BCR, at Landrienne, enjoys his DX-40 and Knight R-100 receiver. BCE had a pleasant trip to VE5-Land, where she met 5QM, another lady operator. The first report was received from W7QMU/-VE8, who will stay at Cape Christian, Baffin Isl. for the next 11 months. AFU and AMA have joined the enthusiastic Three Rivers 2-meter gang. WA's three-element beam is being manufactured at the rate of one element per year. Traffic: W7QMU/VE8 92, VE2DR 47, EC 10.

MANITOBA—SCM, M. S. Watson, VE4JY—The Flin Flon RC reported a successful Field Day was held north of the 54th. Attendance was 20. The following Manitoba amateurs attended the Regina Hamfest: MN, KP and KN. Preparations are being made to cooperate with the Boy Scouts in their On-the-Air Jamboree Oct. 21 to 23. Instructions are to call CQ Jamboree. The International Bureau of Boy Scouts will operate a station at Ottawa under the call VE3JAM. BG has the dope on the 20-meter cubicle quad. GV, IW, DQ, PX, JQ, HP, KN, SQ and MN made the headlines in the recent copy of RF. The Manitoba Hamfest was held at Brandon Sept. 3 and 4. Traffic: VE4CB 44, PE 32, QD 10, AI 7, AN 6, GB 2.

SASKATCHEWAN—SCM, H. R. Horn, VE5HR—Congratulations to the Regina Amateur Radio Association on a successful hamfest. MS won the Gus Cox Memorial C.W. Award again. RE took the CKBI Trophy event. EG and TI were the oldest and youngest hams, by license, attending. 7AZ came from the farthest point. LQ was first in the transmitter hunt. A new trophy, donated by CM, was won by LU for the best overall active amateur. This is a yearly award. YV, the XYL of XX, was the youngest licensed XYL attending. It was decided that Prince Albert would be the host club next year. QC was elected president of the Saskatchewan Amateur Radio League. OF was named vice-president. Let's all get behind Mel and Cliff and give the SARL our complete support when the election for directors is called. AG and LB are new mobiles heard on 75 meters. QC and HQ were the only VE3s attending the Apgar, Mont., Hamfest. Saskatoon hams supplying communications for the Annual Travellers Day Parade during Exhibition Week were QC, XP, CU, HQ, CJ, MI, HR, MN and LM. Congratulations to QC and his XYL on the arrival of a YL jr. operator. TH and his family vacationed at Flathead Lake, Mont., but he found contacts poor on his mobile. Traffic: VE5HQ 140, LM 130. **QST**

Meter Reading by Sound

(Continued from page 15)

The unit may be used with high-current meters (ammeters) if they are of the type having basic

(Continued on page 150)



Because
HARRISON
 is trading **EXTRA HIGH**
 your
Merry Christmas
CAN COME EARLY THIS YEAR

WITH THESE FB



**COMMUNICATORS
 AND RECEIVERS!**



**6 METER
 10 METER
 48 WATT**

COMMUNICATORS

Complete station—powerful VFO Transmitter, sensitive Receiver, speaker, and husky AC pack—all in one rugged, compact cabinet only 7½ x 13 x 12½! Weighing but 29 pounds it is ideal for home shack and for travelling.

G-50 (Technicians delight!) 50 to 54 mc. **\$319.50**

G-28 TEN METER—28 to 29.7 mc. **\$299.50**



**"HOT"
 SSB-AM-CW
 RECEIVER**

Sensitivity—less than 1 microvolt for 6 db signal-plus-noise/noise ratio! Selectivity—adjustable down to 100 cycle bandwidth for CW! Dual conversion, with product and diode second detectors. ANL, 5 meter. Long scale one-band-at-a-time drum dial for 80, 40, 20, 15, 10, and 6 meters. (Real "live" hop on 6!) Plus many other features that make this a truly fine Amateur Communications Receiver in the top class.

G-63 **\$239.50**



**HIGH
 PERFORMANCE
 LOW COST
 RECEIVER**

The Gonset G-33 gives you more, for less money! Performance and features you would expect only in higher price brackets. Full coverage—Broadcast band and 1.8 to 34 mc, with separate bandspread calibration of 10, 15, 20, 40, and 80. Six tubes, internal speaker, smart styling.

G-33 **\$89.95**



**BIGGER
 DOLLAR
 VALUE
 RECEIVER**

Sensitive—Selective—Stable! Point by point comparison proves the Gonset G-43 is better value in its price range.

High Q printed circuits, 1650 kc IF, give better than 3 microvolt sensitivity on all frequencies .54 to 30 mc. Drum dial has I-o-n-g scale for each band, 80 thru 2 meters. Automatic Noise Limiter, 5 Meter, speaker, eight busy tubes!

G-43 **\$159.50**

**BE SURE TO VISIT
 "HAM HEADQUARTERS USA"**
 and especially the World-Famous
HARRISON TRADE-IN CENTER

It is by far the biggest selection in the whole wide world! Come, look them all over, and take your pick from the hundreds of like-new trade-ins. All in top notch condition, and priced to suit any budget.

EASIEST TERMS HIGHEST ALLOWANCES

"Ham Headquarters, USA" ... Since 1925

HARRISON

225 GREENWICH STREET

NEW YORK 7, N. Y.

• **PHONE: BARCLAY 7-7777**

[LONG ISLAND—144-24 HILLSIDE, JAMAICA]



learn code
faster, easier
than ever
before

RIDER SOUND-N-SIGHT CODE COURSE

by Lewis Robins & Reed Harris

- applies Reinforced Learning — psychological principle proved successful by Armed Forces.
 - uses LP records to teach you to hear signal pattern correctly and identify it — how to transmit.
 - uses identification cards to teach you the correct letter associated with each signal pattern.
 - uses instruction book to speed your progress.
- ... plus an imaginary instructor (in complete and novice courses) provides correct answers to speed code learning. Many people have learned to receive 5 words per minute within 9½ hours. Eliminates code plateau barrier!

3 INDIVIDUAL COURSES — THERE'S ONE FOR YOU
COMPLETE COURSE (0-20 words per minute) — Six 10" LP records (192 minutes of recording, 28 recordings), 47 ident. cards, book #REC-020, \$15.95.
NOVICE COURSE (0-5 words per minute) — Three 10" LP records (96 minutes of recording, 28 recordings), 47 identification cards, book #REC-08, \$9.50.
ADVANCED COURSE (9-20 words per minute) — Three 10" LP records (96 minutes of recording, 28 recordings), book #REC-920, \$8.95.

Records prepared in collaboration with the N. Y. Institute of Technology and mfd. by Decca Records.

FROM THE RIDER 'HAM' LIBRARY

GETTING STARTED IN AMATEUR RADIO; BUILDING THE AMATEUR RADIO STATION; HOW TO READ SCHEMATIC DIAGRAMS and the famous RADIO OPERATOR'S Q & A MANUAL (6th edition) Dept. Q10

at parts distributors or order direct



JOHN F. RIDER PUBLISHER, INC.
 116 West 14th Street, New York 11, N. Y.



ORDER YOUR
COLLINS KWM-2
NOW

from

AMATEUR ELECTRONIC SUPPLY

3832 W. Lisbon, Milwaukee 8, Wis.
 Phone: WEst 3-3262



Steve W9EAN

Be Sure to Get Our Top Trade-In Allowance Before Trading ... Free Used Equipment Lists.

Also see Collins KWM-2 at Harris Radio Corporation Fond du Lac, Wisconsin on

Fri. 7-9 Sat. 9-3



Terry W9DIA

TELREX LABORATORIES

ASBURY PARK, N.J.

... is mailing PL 77, the new technical data and pricing bulletin, describing 106 amateur antennas including Balun fed dipoles, Mono, Duo, Tri and 4-band Balun fed antennas. Rotator-indicators, towers, baluns and accessories are shown.

Get your free copy of
"THE PERFORMANCE-LINE" with the "Material" difference!

NO ROOM For

GUESSWORK ...

See Page 173

movements of 50 ma. or so with internal or external shunts. However, many ammeters are of the unshunted type with relatively high internal resistances. The voltage drop across meters of this type may be great enough to temporarily paralyze the 2N229. The reader should not be used with meters of this type. **QST**

Coaxial Feedlines

(Continued from page 21)

feed through of this sort tends to degrade the front-to-side or front-to-back ratio of a beam antenna on reception. By using a somewhat more complicated switching circuit, we could short out or ground unused antennas, and this should help matters. The reader is invited to try this approach, and the author suggests the Centralab switch deck type FFD for the necessary contact arrangement.

Briefly, to make your own coaxial switches, you should first figure out the minimum circuit which will do the job, then build it in a small metal box with the proper coaxial jacks, other connectors and switch.

A word of caution — don't try to switch antennas with the power on. Even with low power, the switch contacts will probably burn right off. This does not apply to switching while receiving, and it is very interesting to note the signal variations that show up, particularly between vertically and horizontally polarized antennas. Try switching your antennas; it's a real help in operating. **QST**

Screen Protection and More

(Continued from page 22)

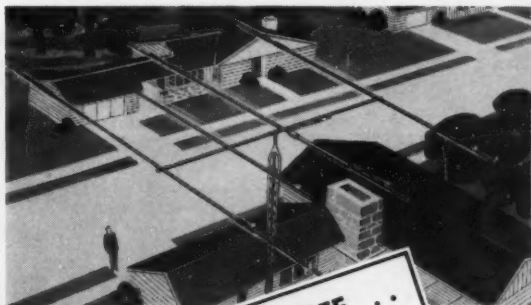
current which will actuate the relay somewhere south of the maximum screen dissipation rating of the tube. The meter shunt formula in the *Handbook* will help determine an approximate value for the setting of R_1 . Then an exact adjustment can be made with the rig fired up.

K_2 is a two-coil relay with a latching mechanism. A momentary pulse to one coil will transfer the contacts, and a pulse to the second coil will return them. The double-throw contacts on K_2 are each rated at 10 amp. with 115 volts and a resistive load. With the two sets of contacts of the reset section connected in parallel, the relay will handle low-power transmitters directly. In high-power applications, the contacts should control a power relay in the main supply line. The holding section contacts should not be paralleled with those of the reset section because of time lag, but they may be used to control auxiliary equipment, indicator lamps, etc. If arcing at the contacts is excessive, external arc suppression is recommended. See the *Handbook* under key clicks.

As with all your equipment, normal precautions should be exercised in installing the relays. Mounting should be such that the contacts are in a vertical plane so dust particles will pass through

(Continued on page 152)

A Word from Ward



WARD J. HINKLE

WHERE OTHER ANTENNAS LEAVE OFF... THE HY-GAIN THUNDERBIRD STARTS!

It was the Bard of Avon, William Shakespeare, who once asked the question: "What's in a name?" And talking about names, I wish I knew why the Hy-Gain people decided to call their magnificent 4-element tribander antenna the "Thunderbird."

Actually, there never was such an animal as the thunderbird! It was a wholly imaginary bird, dreamed up by the people of ancient mythology—or noise or static—is exactly what the bird! It was a wholly imaginary bird, dreamed up by the people of ancient mythology—or noise or static—is exactly what the bird!

Well, sir, thunder—noise or static—is exactly what the THUNDERBIRD ANTENNA DOES NOT STAND FOR. Any man fact that it puts out up one of these antennas will vouch for powerful signals that ever left your QTH.

The Hy-Gain company, you know, has the reputation of being "The World's Largest Manufacturer of Amateur Communication Antennas." Now, I admit I haven't compared their production to Timbuctoo. But I've given you one example of from here long enough to know that they do. Let me give you one example of Gain folks like that if they do. Let me give you one example of statement like that if they do. Let me give you one example of how that Hy-Gain Slim-Trap, the only solid state trap system, is an integral part of every Thunderbird tribander and vertical antenna. Well, sir, even before Hy-Gain put that unit on the market, they wanted to be good and sure it would deliver the goods under all conditions.

To check its resistance to shock, they conducted vibration tests according to Military standards, placing the trap in three different mountings, and making it undergo vibrations from 10 to 55 cps.

Temperature cycling? That trap had a baptism of ice and fire from -60° all the way to 250° F.

Power? All antennas using the Slim-Trap were subjected to the maximum legal power, AM, CW and SSB, generated by all the major commercial manufacturers of amateur transmitters. Now, what about moisture resistance? It gets pretty damp during the rainy seasons in some parts of the U.S.A. To check on this characteristic, they subjected the trap to forty days and nights of relative humidity. It gets pretty damp.

95% of relative humidity from -24° to 160° F.

After all these tests were completed, here's the report as it came from the lab:

"No electrical or mechanical change or damage of any kind occurred. Traps were completely intact mechanically, with no deterioration whatsoever. Frequency and Q remained exactly the same after completion of tests, as they were before."

As I said earlier, I don't know if Hy-Gain manufactures the best most antennas—but sure as shootin', they manufacture the best!

I'll be proud to send you some special literature Hy-Gain made up for us on their antennas. Write for it today.

Sincerely,

Ward J. Hinkle WJH

Before you buy or trade, wire, write, call or drop in to see WARD, W2FEU

ADIRONDACK RADIO SUPPLY

185-191 W. Main St., Amsterdam, N. Y.

Phone: Victor 2-8350

Ward J. Hinkle, Owner

Send for NEW

Hy-gain
antenna catalog



FREE

Complete Hy-Gain
Line IN STOCK!

the TH-4

A 4-element tribander for 10, 15 and 20 meter operation—bright finish aluminum construction of 1" OD boom and 1/2" telescoping to 4" elements. Massive formed steel boom clamp. Solid state Slim-Traps for minimum wind-loading and maximum performance. Unique Beta Match pre-tuned. Interlaced 4th element for optimum spacing. Guaranteed to withstand 1000w AM or 2 KW (PEP). Weighs only 35 lbs.

\$11750

IN 1492 CHRISTOPHER COLUMBUS
**DISCOVERED
AMERICA**



... if he'd made the trip today you can bet
he would be out to discover—

WALTER ASHE'S "SURPRISE" TRADE-IN ALLOWANCE*

* Receivers and transmitters made since 1946

NEW 1961 CATALOG — FREE!

The only radio catalog compiled and designed entirely
with the needs of the amateur in mind!

TIME PAYMENT TERMS AVAILABLE ON ALL EQUIPMENT

Tell us what
you want
to buy—
and what
you have
to trade.
Write today!

Walter Ashe RADIO CO.
Dept. Q-10-60, 1125 Pine St.
St. Louis 1, Missouri

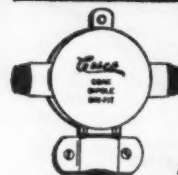
**TAPE RECORDED
CODE INSTRUCTION**

TAPEDCODE®

ONE OF THE FINEST CODE COURSES AVAILABLE
NOVICE TAPE. Complete basic instruction and practice
material up to 8 WPM. \$6.50
ADVANCED TAPE. Practice material 9 to 18 WPM.
Plain language and coded groups. \$5.50
COMPLETE COURSE. Both above tapes. \$11.00
Ppd. in U.S., Possessions and Canada — Penna. Residents
4% tax. Dual Track 7" 1200' tape. Recorded at 3 3/4 IPS.
See Your Local Ham Distributor. If he doesn't
carry them, order direct and give us his name

TAPEDCODE BOX 311, Langhorne, Pa.

**COAX DIPOLE
DRI-FIT CONNECTOR**



The most ideal connector
ever made for dipole anten-
nas. Install in minutes. Com-
pletely moisture proof. For
use with coax cables RG-8,
RG-58, RG-11, RG-59 and 300
ohm twin tubular. Has eye
pull up for inverted V's. One
piece aluminum alloy con-
struction. Weighs only 2 oz.

Amateur Net \$2.95 ea.

Add 15¢ to cover postage

CUSTOM ELECTRONICS, INC.

1918 South Brown Street

DAYTON 9, OHIO

Phone: BA 3-3156

152

rather than deposit on the contacts. If voltages
in excess of 500 or so are involved, the relays
should be mounted on stand-off insulators, or at
least on an insulated panel.

Incidentally, the same arrangement could also
be used in the plate circuit (with an appropriate
value of R_1) to protect the plates against over-
load.

The author wishes to thank W9PNE and
W6SAI for their very able advice and construc-
tive criticism.

QST—

The "Ultimatic" — Transistorized

(Continued from page 84)

monitor off and should rise to about 27 ma. on
mark. The drain from the 3-volt battery BT_2 is
about 1.5 ma. and is about constant from space
to mark. With the monitor on, the drain on both
sources is increased by about 4 ma. With the
monitor on, about 40 hours of life can be obtained
from BT_1 if the specified cells, which are designed
for transistor service, are used. BT_2 , using a pair
of the same cells, should be good for 200 hours.
Penlite cells of the same size will give only half
the service of the transistor-type cells. These
estimates are based on the circuit functioning
until the cell voltage reaches 1 volt from the
fresh 1.5 volts. As BT_1 nears the end of its life,
readjustment of the spring tension on the relay
for the higher speeds will probably be necessary.
When the battery switch S_4 is in the "off" posi-
tion, the circuit is connected to the external
power plug to which may be connected a more
permanent high-capacity battery pack or an a.c.
supply for fixed-station use. The intent of the
self-contained battery supply is to make the
keyer usable on a moment's notice for portable
operation or for lunch-hour practice sessions at
work or school where the minimum of set-up
effort is desirable.

QST—

FEEDBACK — Part I

On page 28 of the September issue, the arrow
at the junction of R_{23} and R_{24} should be labeled
+3 volts.

On page 29, in the caption, R_{59} should be log
taper (IRC PQ-13-128, M13-128, or equiv.).

Correspondence

(Continued from page 84)

existed for quite a while, but how was I to know if I wasn't
notified of it in the signal report? This lack of use of the "T"
part of the RST signal report is characteristic of not only
the Novice, but the General too.

The ARRL has helped a lot with the use of the OO ap-
pointments to safeguard the privileges of amateur radio.
The Official Observer also helps the amateur to keep his sig-
nal "clean" and avoid citation from the FCC.

Today all the bands are crowded. One bad signal can make
it bad for a lot more. — Norm Wilson, WY6JVD, Corcoran,
Calif.

THIRD PARTY TRAFFIC

☐ Suggest a QST editorial on the third-party traffic rules,
republishing the permitted countries, etc., for the benefit
of a large group of amateurs who are, by their actions,
not familiar with the rules. Recently I refused to take third

(Continued on page 164)

LEARN ELECTRONICS EASIER, FASTER THAN YOU EVER IMAGINED ... AT LOW COST!

BASIC AREAS OF ELECTRONICS

- BASIC ELECTRICITY** ('Pictured-Text' Course), Van Valkenburgh, Nooger & Neville, 3 vols., soft covers, \$10.00 cloth, \$11.50
- BASIC ELECTRONICS** ('Pictured-Text' Course), Van Valkenburgh, Nooger & Neville, 5 vols., \$10.00 cloth, \$11.50
- VOL. 6, BASIC ELECTRONICS** ('Pictured-Text' Course), Van Valkenburgh, Nooger & Neville, soft cover, \$2.90; cloth, \$3.60
- BASIC TELEVISION** ('Pictured-Text' Course), Alex Schure, Ph.D. 5 vols., soft covers, \$10.00; cloth, \$11.50
- BASICS OF FRACTIONAL HORSEPOWER MOTORS & REPAIR** ('Pictured-Text' Course), G. Schweitzer, soft cover, \$3.90; cloth, \$4.90
- HOW TO READ SCHEMATIC DIAGRAMS**, D. Mark, \$3.50
- BASIC VACUUM TUBES & THEIR USES**, J. F. Rider & H. Jacobowitz, \$3.00; cloth, \$4.50
- R-L-C COMPONENTS HANDBOOK**, D. Mark, \$3.50
- VIDEO TAPE RECORDING**, Julian Bernstein, cloth \$5.95
- MAGNETIC AMPLIFIERS — Principles & Applications**, Paul Mali, \$2.45

SPACE AGE & NUCLEAR FUNDAMENTALS

- BASICS OF GYROSCOPES** ('Pictured-Text' Course), Carl Machover, E. E., 2 vols., soft cover, \$6.60; cloth, \$7.75
- BASICS OF MISSILE GUIDANCE & SPACE TECHNIQUES** ('Pictured-Text' Course), M. Hobbs, P. E., 2 vols., soft covers, \$7.80; cloth, \$9.00
- FUNDAMENTALS OF RADIO TELEMETRY**, M. Tepper, \$2.95
- FUNDAMENTALS OF NUCLEAR ENERGY & POWER REACTORS**, H. Jacobowitz, \$2.95
- INTRODUCTION TO ATOMIC ENERGY**, Wm. G. Atkinson, \$1.35

INDUSTRIAL ELECTRONICS

- BASICS OF INDUCTION HEATING** ('Pictured-Text' Course), C. Tadmury, M.S., 2 vols. soft covers, \$7.80; cloth, \$8.90
- BASIC CARRIER TELEPHONY** ('Pictured-Text' Course), D. Talley, E.E., soft cover, \$4.25; cloth, \$5.75
- BASIC ULTRASONICS** ('Pictured-Text' Course), C. Glickstein, soft covers, \$3.50; cloth \$4.60

COMPUTERS

- BASICS OF DIGITAL COMPUTERS** ('Pictured-Text' Course), John S. Murphy, 3 vols. soft cover, \$8.40; cloth, \$9.50
- DESIGN OF TRANSISTORIZED CIRCUITS FOR DIGITAL COMPUTERS**, A. I. Pressman, cloth, \$9.95

TRANSISTORS

- FUNDAMENTALS OF TRANSISTORS** (2nd ed.), Leonard M. Krugman, P.E., \$3.50
- PRINCIPLES OF TRANSISTOR CIRCUITS**, S. W. Amos, B.Sc., \$3.90
- FUNDAMENTALS OF TRANSISTOR PHYSICS**, I. Gottlieb, P. E., \$3.90

These and many other Rider titles are available at bookstores, electronic parts distributors, dept. stores or direct. Send for new catalog.

Buy these books today—No matter where you buy these books, we guarantee satisfaction, or your money back within 30 days of purchase.

AUDIO AND HIGH FIDELITY

- BASIC AUDIO** ('Pictured-Text' Course), by Norman H. Cronkhat, 3 vols. soft, \$8.70; cloth, \$9.95
- STEREOPHONIC SOUND**, N.H. Cronkhat, \$2.25
- HIGH FIDELITY SIMPLIFIED** (3rd ed.), H. D. Weiler, \$3.30
- FUNDAMENTALS OF HIGH FIDELITY**, H. Burstein, \$2.95
- REPAIRING HI-FI SYSTEMS**, D. Fidelman, \$3.90
- AMATEUR RADIO**
- GETTING STARTED IN AMATEUR RADIO**, Julius Berens, W2PIK, \$2.40
- BUILDING THE AMATEUR RADIO STATION**, Julius Berens, W2PIK, \$2.95
- RADIO OPERATOR'S LICENSE Q & A MANUAL** (6th edition), Milton Kaufman, cloth, \$7.10
- SHORTWAVE PROPAGATION**, S. Leinwoll, \$3.90
- RIDER GLOBAL TIME CONVERSION SIMPLIFIER**, J. G. Daiger, \$1.00
- HOW TO USE GRID-DIP OSCILLATORS**, Rufus P. Turner, P. E., K6AI, \$2.50
- SOUND-N-SIGHT CODE COURSE**, Lewis Robins and Reed Harris, Complete Course, six 10" LP records, (9 to 20 words/minute), \$15.95; Novice Course, three 10" LP records, (0 to 8 words/minute), \$9.50; Advanced Course, three 10" LP records, (9 to 20 words/minute), \$8.95

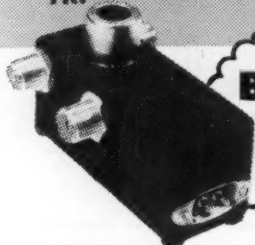
ENGINEERING TEXTS

- ENCYCLOPEDIA ON CATHODE-RAY OSCILLOSCOPES**, (2nd ed.) Rider & Utman, 1360 pages, cloth, \$27.00
- CONDUCTANCE CURVE DESIGN MANUAL**, Keats A. Pullen, Jr., Eng.D., stiff cover, \$4.25
- CONDUCTANCE DESIGN OF ACTIVE CIRCUITS**, Keats A. Pullen, Jr., Eng.D., cloth, \$9.95
- UNDERSTANDING MICROWAVES** (Abridged Reprint), V. J. Young, Ph.D., \$3.50
- FAMOUS ELECTRONIC TECHNOLOGY SERIES**
by Alexander Schure, Ph.D. Each book is devoted to a specific area of electronic technology.
- RC & RL TIME CONSTANT**, 90¢; **FM LIMITERS & DETECTORS**, 90¢; **FREQUENCY MODULATION**, 90¢; **CRYSTAL OSCILLATORS**, \$1.25; **A-M DETECTORS**, \$1.25; **LIMITERS & CLIPPERS**, \$1.25; **MULTIPLIERS**, 90¢; **R-F TRANSMISSION LINES**, \$1.25; **AMPLITUDE MODULATION**, \$1.25; **BLOCKING OSCILLATORS**, \$1.25; **WAVE PROPAGATION**, \$1.25; **SUPERHETERODYNE CONVERTERS & I-F AMPLIFIERS**, 90¢; **L-C OSCILLATORS**, \$1.25; **ANTENNAS**, \$1.50; **INVERSE FEEDBACK**, 90¢; **RESONANT CIRCUITS**, \$1.25; **ELECTROSTATICS**, \$1.35; **D-C CIRCUIT ANALYSIS**, \$1.35; **A-C CIRCUIT ANALYSIS**, \$1.80; **MAGNETISM & ELECTROMAGNETISM**, \$1.80; **VACUUM TUBE RECTIFIERS**, \$1.50; **VACUUM TUBE CHARACTERISTICS**, \$1.80; **IMPEDANCE MATCHING**, \$2.90; **GAS TUBES**, \$1.50; **ADVANCED MAGNETISM & ELECTROMAGNETISM**, \$2.50; **R-F AMPLIFIERS**, \$2.40; **VIDEO AMPLIFIERS**, \$1.80; **LOW-FREQUENCY AMPLIFIERS**, \$1.80; **LOW-FREQUENCY AMPLIFIER SYSTEMS**, \$1.80; **PHOTOTUBES**, \$1.80.



JOHN F. RIDER PUBLISHER, INC. 116 West 14th Street, New York 11, N. Y.
Canada: Chas. W. Pionton, Ltd., 66 Racine Rd., Rexdale, Ont.

DOW-KEY DKC-TRP COAXIAL ELECTRONIC TR SWITCH



WITH
**Built-in
Power
Supply**

Designed to operate in 1.8 to 30 mc. range. NO EXTERNAL D. C. POWER NEEDED! Just plug into any regular 120 v. A. C. outlet. About 15 watts power required.

FEATURES INCLUDE: Rated maximum legal amateur power. Low VSWR. Cast aluminum construction makes DKC-TRP TVI proof. Switch allows break-in operation with single antenna system. Type N connectors available at slight additional cost.

FACTORY DKC-TRP
WARRANTY! . . . Each **\$27.75**

See your Electronic Dealer.

DOW-KEY CO. INC.

THIEF RIVER FALLS, MINNESOTA

TRI-BAND-QUAD

COMPLETE PLANS **\$1.**

- No Stubs
- High F to B
- Very Broad
- High Grain
- Low S. W. R.
- 30 Lbs. Max.

BARRINGTON SPECIALTIES, Box 154, Barrington, R. I.

FREE COIL BULLETIN

Technical data on coils specified in QST and Handbook. Standard coil series ideal for experimenters and designers.

NORTH HILLS ELECTRONICS INC.

Glen Cove, Long Island, New York

DISTRIBUTORS: Harrison Radio Corp., New York, N. Y.
Radio Shack Corp., Boston, Mass.
Zack Radio Supply Co., Palo Alto, Calif.

Franky the Frog

says: Frankly now, is your shack in a good safe condition? Have you checked up on your wiring? Is everything neat and tidy? Do you practice "Switch to Safety" when checking your equipment?

After checking if you find you need help or parts, we have six hams to serve and advise you. We feature name brand equipment like COLLINS, ELMAC, GONSET, HALLICRAFTERS, HAMMARLUND, HY-GAIN, and E. F. JOHNSON — to name just a few.

FRANKY wants to remind all you hams that the red hot DX season is on. So remember — we have been in business since 1928 and as THE AMATEUR HEAD-QUARTERS in Southern New England we want to make this your best and most "awarding" season ever.

W. H. EDWARDS CO., INC.

116 Hartford Ave., Providence 9, R.I. • Tel. GA 1-6158-6159-6414



party traffic for HZ1AB, who then tried to talk me into it (without success). I later heard the traffic being accepted for Oklahoma City by a W4. I also still hear numerous other third-party traffic being handled from nonagreement countries for armed forces people located there. Some of these foreign stations allege "emergencies." Such contentions are not valid as Red Cross facilities exist for this type of traffic and, in fact, must be used prior to the approval of an emergency leave back to the States. — Major Fred G. Alden, K11DW, HQ 100th Bomb Wing, Pease AFB, New Hampshire.

[Editor's Note: Readers are again reminded that messages and other communications on behalf of third parties may be handled internationally by U. S. amateurs only with the following countries: Canada, Chile, Peru, Ecuador, Liberia, Cuba, Panama, Costa Rica, Nicaragua, Mexico, Venezuela, Haiti, and Honduras. Further, only relatively unimportant traffic may be handled with these countries.]

Third-party traffic between points where amateurs are licensed by some branch of the U. S. Government (i.e., where calls begin with W or K) is of course permissible, and the only restriction is on messages in which the operator has a pecuniary interest. However, no third-party communications may be handled with KAs in Japan.]

PROBLEM SOLVED?

☞ Your front cover (August QST) must have "stopped" every ham who was ever mobile.

The solution? There is a classified ad on page 164 which says that WICUT has a Gonset II for sale. HI! — Bill McMahon, W1YCP, East Hartford, Conn.

THE FIRST CALL . . .

☞ I note in the article entitled "The Key to Communication" by Louise Ramsey Moreau in the August issue she mentions that the first call for help from a ship went out from the key of the late Jack Binns, operator on the Republic.

I wish to point out that the distinction of first using radio telephony to summon aid to a ship in distress went to my old friend, the late Ludwig Arnsen of the Radio Receptor Corporation, who was wireless operator aboard the old liner Kronland. On December 7, 1903 while 190 miles off the coast of Ireland, the vessel lost one of her two propellers. In response to the message sent out by Mr. Arnsen, aid was forthcoming in the form of a British cruiser. — Richard S. Egolf, W2WX, RCA Communications, New York, New York.

GMT USAGE

☞ I note with satisfaction that at long last you are starting to put emphasis on GMT in ham radio communications. Why this has taken so long to bring before the amateur radio fraternity is beyond the comprehension of my feeble mind. In all my log entries, on all my QSLs etc., I have used GMT since coming out of the Navy after WWI, which was in 1919, and if anyone can dig up one of my QSLs with any time but GMT so designated, I will buy him a new straw hat and eat his old one — with cream and sugar yet. It is so much easier to make use of GMT in setting schedules. I am sure that if these youngsters getting into our favorite hobby would just get accustomed to GMT, its use would soon be universal. I have a 24-hour clock with a fifteen inch dial in my shack; it is set to GMT and has never been set for any other time. It's the only clock in the shack. — J. W. Anderson, W6QV, Los Angeles, Calif.

DX Contest

(Continued from page 62)

AFRICA

Angola	French Equatorial Africa
CR6CA.....5148- 12-143- A- -	FQ8AF.....21,750- 29-250- A- -
Liberia	Belgian Congo
EL8D.....49,620- 29-560- B- -	OQ5FV.....7656- 24-107- A-18
Eritrea	Nigeria
ET2US.....252- 6- 14- C- 8	ZD2JKO.....44,064- 34-432- A-25
Algeria	Union of South Africa
FA3JY.....1485- 0- 55- A- -	ZS5OA.....30,060- 35-372- A- -
	ZS6YB.....14,421- 23-209- A- -

(Continued on page 166)

Your Ham Headquarters — WASHINGTON to FLORIDA

SPECIALIZING IN THE BEST AT EASY TERMS
HIGH TRADES AND LOW DOWN PAYMENTS
WRITE FOR DETAILS OF OUR TIME PAYMENT PLAN



Two hamshacks One Transceiver

At home, on the highway, anywhere . . .
a complete, superior SSB station with
**COLLINS KWM-2 and PM-2
PORTABLE POWER SUPPLY**

Collins KWM-2 Transceiver gives
you Collins Single Sideband and CW
fixed station performance. It covers all
amateur bands from 3.4 to 29.7 mc with
1 kc accuracy. 175 watts P.E.P. input on
SSB, 160 watts on
CW. Weighs only
18 pounds.

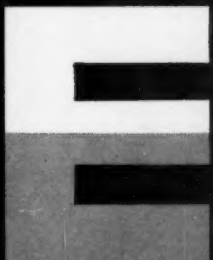
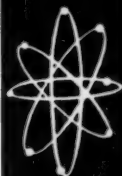


Collins PM-2 Portable Power

Supply with built in auxiliary speaker connects directly to the KWM-2 to give you a rig that operates on either 115 or 220 volt ac. Foam plastic-lined Samsonite suitcase provides shock resistant protection for the KWM-2, PM-2 and accessories for a complete station weighing less than 45 pounds.

See the entire Collins S/Line . . . stop in soon.

KWM-2 Transceiver\$1150.00
PM-2 Power Supply
and carrying case 250.00



ELECTRONIC SUPPLY

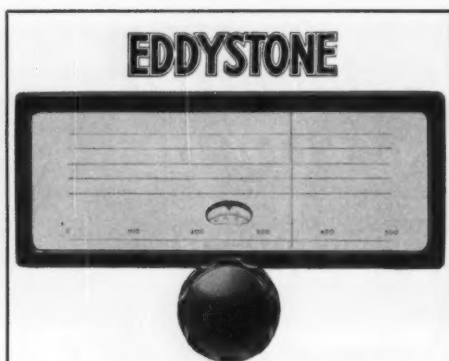
61 N-E 9th STREET • MIAMI 32, FLA • Phone Franklin 7-2511

ELECTRONIC SUPPLY

1301 Hibiscus Blvd. • MELBOURNE, FLA. • Parkway 3-1441

ELECTRONIC WHOLESALERS, INC.

2345 SHERMAN AVE. N.W. • WASHINGTON 1, D.C. • Phone Hudson 3-5200



GEARED SLOW MOTION DRIVE For Amateur Radio & Communications RECEIVERS & TRANSMITTERS

A high grade assembly, flywheel loaded, manufactured to fine tolerances, provides a smooth positive drive with a reduction ratio of 110:1. The vernier with its 100 divisions rotates 5 times for one pointer traverse, giving 500 divisions with positive reset readings. A cam adjustment on the vernier assures correct zero setting. A spring loaded jockey arm maintains tension of the pointer drive. Overall dimensions 9 1/4" x 5 3/4".

Manufactured by
Stratton & Co., Ltd. (Eddystone) PRICE \$15.00 NET
Birmingham, England Postpaid

Distributed by
BRITISH RADIO ELECTRONICS, LTD.
1833 Jefferson Place, N.W.
WASHINGTON 6, D. C.

"... MOST INTELLIGENT APPROACH ..."

LEARN RADIO CODE

The EASY WAY

No Books To Read - No Visual
Gimmicks To Distract You. Just
listen and learn

Based on modern psychological techniques—This course will take you beyond 13 w.p.m. in

PRICE \$9.95
LESS THAN 1/2 THE TIME
See Your Dealer Now!

Album Contains
Three 12" LP's
2 1/2 Hr.
Instruction

EPSILON RECORDS 2769 CAROLINA
REDWOOD CITY, CALIF.

NOT THIS ... BUT THIS!
Plus "ITQ"

E-Z WAY TOWERS, INC.
P. O. BOX 5491 - TAMPA, FLA.

Z86AFA.....239- 6- 13- A- - ON4IS.....3540- 15- 79- A- -

ASIA

Korea

HL0KR.....22,518- 27-278- B-16

Japan

JA3IS.....46,788- 42-372- B-46
KA2CB.....46,276- 46-338- C-33
KA2GI.....32,705- 31-352- A-31
JA3EK.....17,085- 17-335- A-20
JA1GC.....15,120- 28-181- A-21
JA9CQ.....10,116- 18-189- A-21
JA1YL.....7884- 27- 98- A- -
JA1AAT.....7182- 18-133- A- -
JA6GT.....6752- 16-142- A- -
JA1BUN.....5904- 18-110- A-16
JA8BY.....5616- 16-118- A- -
JA1BDF.....5040- 15-113- A- -
JA2JW.....3378- 7- 18- A- 5

India

VU2BK.....7200- 24-100- A- -

EUROPE

Germany

DJ1BZ.....114,534- 54-715- B-55
DL7AD.....13,328- 34-131- A-21
DL3DW.....1326- 17- 26- B- -
DL6DF.....581- 7- 30- A- -

Spain

EA3JE.....193,068- 62-1038- A-70
EA2H.....36,732- 36-340- A- -
EA1FD.....18,900- 35-180- A- -
EA2DT.....3531- 11-107- A-36
EA7JT.....1215- 15- 27- A-20

France

F3OX.....14,056- 28-168- A- -
F2MO.....2822- 12- 79- A- 9
F8II.....972- 9- 36- A- -
F8II.....693- 7- 33- A- -

England

G2DYV.....85,491- 59-483- A-61
G3LTZ.....46,440- 36-434- A-61
GB2SM (2 ops.).....178,059- 61-973- A-64
G3NUG (G3e NPZ NUG NZW)
52 087- 49-357- A-50
G3LGA (G3e JUL LGA)
10,560- 32-110- A- 9

Scotland

GM3BCL.....11,837- 19-209- A-18

Hungary

HA1KSA (3 ops.).....11,528- 22-175- A- -
HA5KDQ (3 ops.).....264- 8- 11- B-12

Switzerland

HB9DX.....7548- 17-148- A- -

Italy

I1ZFT.....26,190- 30-291- A- -
I1DFB.....6578- 22-100- A-22
I1TC.....6773- 23- 84- A- 4
I1NE.....621- 9- 23- A- 2
I1ZCN.....231- 7- 11- A- 3

Norway

LA1JC.....76,980- 47-546- A-30
LA1TE.....60,114- 43-406- A-28
LA6CF.....16,511- 19-290- A- -
LA2JE.....6432- 16- 34- A-39

Luxembourg

LX1HM.....14,075- 25-189- A-10

Finland

OH3SM.....106,050- 50-711- A-54
OH5PN.....3822- 13- 99- A- -
OH2RL.....1500- 10- 50- A- 7

Czechoslovakia

OK3KGI.....945- 9- 35- A- -
OK1JX.....102- 6- 6- B- -
OK3KRN.....12- 2- 2- A- 1

Belgium

ON4OC.....244,288- 64-1278- A-61
ON4GM.....77,428- 44-579- A- -
ON4LX.....82,250- 50-349- A-29

Denmark

OY7ML.....12- 2- 2- A- -
OZ5JT.....64,872- 51-424- A-50
OZ7G.....2010- 15- 45- A-16
OZ5KP.....744- 8- 31- A- -
OZ5KQ.....504- 8- 21- B- -

Netherlands

PA0HBO.....55,620- 45-412- A-26
PA0DVM.....9724- 28-120- A-20
PA0DJ.....4686- 22- 72- A-10
PA0KSB.....2128- 16- 45- A- 6
PA0ATY.....195- 5- 13- A- -

Sweden

SM3EP.....20,604- 34-202- A- -
SM5BLA.....12,576- 24-175- B- -
SM5MC.....144- 6- 8- B- 5

Poland

SP5XM.....5300- 20- 89- A-16

European Russian S.F.S.R.

UAINA.....5194- 14-126- A- -
RA3KKT (2 ops.).....111- 3- 13- A- 3

Ukraine

UB5KAW.....972- 6- 54- A- -
RB5AJU.....835- 5- 56- A- -

White Russian S.S.R.

UC2AA.....22,072- 31-239- B-25

Latvia

UQ2AN.....8025- 25-107- B-10

Estonia

UR2KAE.....27,861- 37-253- B- -

NORTH AMERICA

Cuba

CO2DD.....85,260- 49-580- B-26

San Andres and Providencia

HK9AI.....169,050- 49-1150- A- -

Panama

HP1AC.....79,991- 41-652- A-37

Guanlanamo Bay

KG4AP.....33,924- 33-343- A-16

Puerto Rico

KP4AIU.....279,488- 64-1456- B-65
KP4AOO.....29,481- 31-317- A-14

Guatemala

TG5HC.....82,404- 63-436- A- -

Costa Rica

T12RO.....119,534- 59-683- A-57

Antigua

VP2AR.....109,620- 58-634- A-51

Dominica

VP2DX.....506,250- 90-1875- B-80

Turks & Caicos

VP3AB.....8832- 23-128- A-14

Bahamas

VP7NT.....6996- 22-106- A- -

Mexico

XE1POE.....10,500- 28-126- A-16

Nicaragua

YN4CB.....172,746- 63-930- A-50

OCEANIA

Philippines

DU7SV.....16,762- 29-197- B- -

New Caledonia

FK8AU.....6768- 24- 94- A-19

(Continued on page 158)



FORT ORANGE

Radio Distributing Co., Inc.

904 BROADWAY ALBANY 4 N.Y. U.S.A.
AMATEUR HEADQUARTERS

Cable Address "Uncle Dave"

CALL ALBANY KE 6-8411

NITES GR 7-5891



COLLINS KWM-2

The advanced amateur's 80-10 meter transceiver-system engineered for mobile and home operation.

Superior single sideband performance in a variety of installations is assured by the Collins KWM-2 Mobile Transceiver. Engineered for the amateur who desires an 80 through 10 meter mobile transceiver, the KWM-2 design incorporates time-proven and advanced communication concepts.

Price \$1296.00
516F-2 AC Power Supply 115.00
516E-1 12V DC Power Supply 270.00



PRICE
\$495.00

Gonset GSB-101 Linear Amplifier

Here's a linear amplifier that gives you the best power-per-dollar ratio of all. Capable of 1000 watts P.E.P. input, this grounded-grid linear amplifier does not waste drive power by swamping the exciter. Driving power appears in the output of final. What's more, the GSB-101's superior design means up to 65% efficiency!

MATCHING GSB 100-SSB Exciter
Price \$499.50



HQ 180
\$429.00

The Hammarlund
HQ-ONE-EIGHTY

Triple conversion—18-tube superheterodyne circuit • full dial coverage from .54 MCS to 30.0 MCS • New high frequency crystal filter • Slot Filter • Separate Linear Detector • Selectable Sideband • Built-in 100 KCS crystal calibrator • Exclusive design automatically adjusts audio passband to fit receiving conditions • Automatic noise limiter.

Price \$429.00 — Clock \$10.00 — \$200 Speaker \$19.95

USED AND SPECIALS

NATIONAL

HF5 \$149.50
NC188 (Demo) 119.50
NC125 125.00
NC300 275.00
HRO50T 375.00
NC183 125.00

HALLICRAFTERS

SX99 125.00
SX62A 275.00
SI02 39.50
SX100 225.00
HT33 495.00
HT20 290.00

JOHNSON

KW Matchbox 95.00
Kilowatt Amp w/desk 1295.00
Pacemaker 375.00
Valiant 350.00

LAKESHORE

Bandhopper 114.95

GLOBE

755A 49.95
90A 54.95
UM-1 32.50

GONSET

30-40mc Tuner 49.50

HEATH

OF-1 5.95
AT-1 20.00

CENTRAL ELECTRONICS

20A 225.00
A Slicer 49.50

HAMMARLUND

HQ100 195.00

B & W

51 SB 185.00
5100-B 375.00

MULTI • ELMAC

PMR 7 125.00

COLLINS

32V2-51SB (As is) 295.00

ODD ITEMS

HAND CARBON Mikes
\$1.25 ea — 12.50 Doz 72 ohm kilowatt twin-lead per 100 ft
4.95, 6 volt D.C. RELAYS .99
Ceramic Insulators 1" to 3" .29 to .49

Please write for more complete list as well as separate literature on any new merchandise.

Address your ham problems to
Uncle Dave W2APF
or Tiny W2KNN

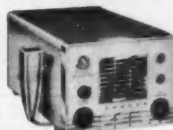


THE MODEL 2-A BRINGS YOU SUPERIOR SSB & AM

Drake 2A receiver - 2AS Speaker, Tri-

ple conversion with crystal controlled first converter for maximum frequency stability. Continuous sideband selection without retuning. Reception of SSB, AM and CW with full RF gain, complete AVC action and accurate S-meter indication. Distortion-free product detection. Convenient tuning rate with deviation scale. High sensitivity, low noise. Compact size. Also a choice of Slow or fast AVC. Selectivity band width. Product or diode detector.

Drake 2A receiver \$269.95
Drake 2AS speaker 12.95



JOHNSON MESSENGER CITIZENS' RADIO TRANSCEIVER

Anyone can operate . . . no exam-

ination necessary . . . license issued by the FCC on request! Complete 23 channel Citizens' Band coverage (Class "D", 27 Megacycle Frequencies) Chose any 5 channels by the flip of a switch!

Model 242-128 (110 AC or 12V DC)
Model 242-127 (110V AC or 6V DC)
(with xtal for one channel) \$144.75
Extra xtals (per set) \$7.95; Mobile mount \$2.50; Noise Suppression Kit \$13.50.

ONLY
\$795.00

CENTRAL ELECTRONICS 100V (Single Sideband-Transmitter-Exciter.)

Central Electronics — the pioneer of amateur SSB and Broadband linear amplifiers proudly presents the 100V — the ultimate in operating ease and convenience — with any desired mode of operation — SSB, DSB, AM, PM, CW or FSK!

Changing bands or emission requires no more effort than bankswitching your receiver. There is no such thing as "tuning up" a 100V — all tuning (except the VFO, of course), is completely eliminated! Central Electronics' patented broadband circuitry is used throughout.

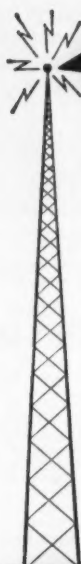
Write Uncle Dave
W2APF
with your needs
and problems.

FREE!
TIME PAYMENTS

NET CONTROL
• LOG SHEETS
• MESSAGE PADS

18 Months to pay. Life Insurance at no extra cost

UNCLE DAVE'S RADIO SHACK
A SUBSIDIARY OF
FORT ORANGE RADIO
DISTRIBUTING CO.



you haven't heard?

EVANS OFFERS

COMPLETE SERVICE

- To HAMS - - - By HAMS
(12 licensed employees)
- EQUIPMENT AND COMPONENTS
(Ham - Electronic - Electrical)
- TRADE-INS
(on new or used units)
- TIME PAYMENTS
(flexible, financed ourselves)
- ENGINEERING DEPARTMENT
(backing all equipment sales)
- RECONDITIONED EQUIPMENT
(largest inventory in the Northeast)
- EXPERIENCE - - - 26 years as:

"YOUR FRIENDLY SUPPLIER"

Evans RADIO

CA 5-3358 • ROUTE 3A • BOW JCT.
BOX 312 • CONCORD, N. H.

\$3.95 P.P. in
U.S.A.

• Fixed or Mobile • Can be
stacked • Light Weight • Excellent for CD & Nets •
Elements, Hub, Hardware, Phasing Section, and In-
struction Sheet Included.

MERCURY ENTERPRISES

Box 273
Granby, Conn.

CANADIANS! We have large stocks of nationally
advertised Ham parts. Write for Free Bulletin.

THE CRAWFORD RADIO

P.O. BOX 617

VE3YR 119-121 JOHN ST., N. VE3JU
"Geo" HAMILTON, ONT. "Bill"

LOOK NO GUYS

IT'S got

"ITQ"

Write for
FREE BROCHURE

E-Z WAY TOWERS, INC.
P. O. BOX 5491 - TAMPA, FLA.

Wake Island	Argentina
KW6CQ... 4848-16-101- A-6	LU1DAB... 88135-35-555- A-34
K6QPG/KW6.072- 9-36- A-3	LU2BN... 16,632-28-194- B-
Marshall	LU5DDF... 15,039-27-187- A-22
KX6CS... 16,191-21-257- A-23	LU4EJ... 2211-11-67- A-3
Australia	LU8CW... 1440-15-32- A-4
VK3ATN... 49,396-53-313- A-17	Peru
VK2AKF... 26,145-41-215- A-26	OA1W... 27,684-36-258- A-22
VK3MK... 3823-13-91- A-	Brazil
Fiji Islands	PY2ADT... 4396-14-105- B-13
VR2BC... 51,435-45-381- A-16	Netherlands Guiana
New Zealand	PZ1AX... 38,050-50-258- A-18
ZL1MQ... 90,540-60-503- A-	British Guiana
SOUTH AMERICA	VP3HAG... 177,072-68-868- A-30
Chile	VP3YG... 30,788-43-240- A-11
CE1AD... 5280-16-111- B-	Venezuela
Colombia	YV5AGD... 19,320-35-184- B-13
HK3LX... 83,240-55-524- B-23	YV5ED... 9309-29-107- A-

QST

¹ W1WPR, opr. ² Hq. staff - not eligible for award. ³ W2LHL, opr. ⁴ W7GHX, opr. ⁵ K6QPG, opr.

Check logs: C. w. - W2s GES JGU W3s QQR VTH ZAO, W4LRN, W3MSC, W6HPB, K7ADD, W7BTH, W8s QQH SZW, W9LZ, K9MTY, W9NXU, W9EKS, EL4A, F08AC, G2s MPH ZR, GD3FBS, LA1K, OH6PJ, OK3KMS, OZ4RT, OZ6SQ, PA8NW, SM7MS, SP9KAS, UA4RHN, VE1AE, VE2AJD, VE3s CYX DDU, VE5CX, VQ2RG, VQ3PBD, VU2MD, Y03FN, ZE3JJ, 9G1BQ; Phone - K1JKA, W1s MGP RFQ, W3MDJ, W4JH, W5MSG, KC6JF, K9MTY, DL8YC, EL4A, G4RY, LA3K, OZ5SQ, PA8SNG, VK2JZ, VQ2PBD, ZS6ARX.

World Above

(Continued from page 79)

Toledo, at 2130 CDT on 432.078 Mc. Bob transmits on odd five minute periods. While we're on the subject of schedules, we might point out that Steve, W00JL, is transmitting on 432.020 Mc. from 0130 GMT to 0200 GMT with his antenna on New Jersey. Steve is using 64 elements with a 4X250B in the final amplifier.

O.E.S. Notes

K1AII, Plymouth, Mass. - 50 Mc. W's 2, 3, 4, 8, 9, VE1 and VE3 during July. VO1DW worked again on July 30.

K1CIG, Manchester, N. H. - Several good openings on 50 Mc.

K1CXX, Auburn, Maine - Good 50 Mc. aurora into Maine on the 15th of July, heard K7 in Montana calling CQ Vermont, couldn't raise him.

W1FVV, Hartford, Conn. - Seasonal openings on 50 Mc. during July to W4, W5, W9. One short opening to Michigan for a new state; no activity on 144 Mc.

K1GQK, Contoocook, N. H. - Many openings on 50 Mc. during the middle of June, but not much else.

K1JML, Malden, Mass. - 6 meter activity only, contacted VO1DW.

K1KUY, Marblehead, Mass. - Seasonal openings on 50 Mc. No activity on 144 Mc.

W1LMZ, Concord, Mass. - VO1DW heard and worked on July 30 on 50 Mc. Worked 2, 3, 4, 8, on aurora on 144 Mc. On the 29th W4's were worked, hear VE2TT nightly on 144.31.

K1MHC, Winchester, Mass. - Working on a new single sideband high-level mixer for 2 meters, caught the July 15 aurora openings on 144 Mc., but could not raise anyone.

W3RTV, Verona, Pennsylvania - 50 Mc. open July 3 to S. Dakota, Eastern Ohio stations 86-S9 on 144 Mc. nightly at this QTH.

W4CIN, Birmingham, Alabama - Good copy of stations on 50 Mc. within 200 mile radius of Birmingham during July.

K4EUS, Chester, Va. - Caught the July 15 opening on 144 Mc. Worked 3's, 1's, 8's and 2's; heard W9ZIH and VE3IK.

K41QU, Huntsville, Alabama - Finished 75 w. mobile transmitter for K4OCV's mobile.

(Continued on page 160)

Introducing THE NEW GLOBE Mobiline Six...



6 METER MOBILE OR FIXED STATION TRANSCEIVER

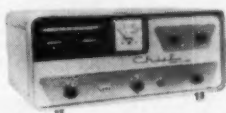
CRYSTAL OR VFO CONTROLLED WITH 20 WATTS INPUT

The smartly styled new Mobiline Six is a compact transmitter and receiver combination for equal 6 meter adaptability to a fixed or mobile installation, operating from 115v AC, 12v DC or 6v DC, all with the power supply provided. It weighs only 20 pounds. Sized only 5" x 12", the unit takes little space in either home or car.

The receiver portion utilizes 7 tubes, including an RF stage delivering better than 1 mv sensitivity. A squelch control is also provided in the Mobiline Six.

In the transmitter section, the internal VFO is voltage regulated and shock mounted to provide the utmost stability under adverse mounting conditions. The 2E26 amplifier stage is conservatively operated to handle 20 watts input power.

VFO or XTAL control; "S" meter, tuning meter, slide rule dials, VFO spotting and Class B modulation are a few of the other feature highlights. \$229.95.



the Globe Chief Deluxe

Globe's quality, compact and self-contained bandswitching 10-80M transmitter for 90 watts CW (75 watts for novice). Cathode or bias keying. Built-in power supply. New Pi-Net. Plug-in for external accessories.

Wired: \$7995

Kit: \$5995



the Globe Scout Deluxe

Now, Relay Controlled Circuitry

Versatile 90w CW, 75w AM Xmtr., bandswitching 80-6M. Straight thru operation. Pi-Net matches 50-300 ohms 80-10M. 50-75 ohms link coupled on 6M. High level plate modulation. Plug-in VFO or crystal. Shielded & filtered.

Wired only: \$15995

Trades
Accepted

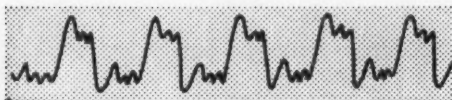


Easy
Financing
Available



WRITE FOR OUR FREE USED EQUIPMENT LIST

100 S. Wayne St., Arlington, Virginia, JA 4 5422
11254 Triangle Lane, Wheaton, Maryland, LO 5 3696



**Add threshold control
to your HQ-170 or
HQ-180 with the NEW**

HAMMARLUND NOISE LIMITER

Just the thing for noisy locations . . . a Lamb-Type noise limiter of improved performance that reduces impulse noise (ignition-type) to a minimum. Complete kit, ready-to-install in about 15 minutes. Available from your Hammarlund dealer, or direct from factory . . .

\$33.50

*Write for complete details



HAMMARLUND
HAMMARLUND MANUFACTURING CO., INC.
An Affiliate of Telechrome
460 W. 34th ST. N. Y. 1. N. Y.

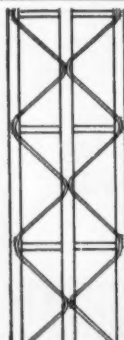


Groth
TURN COUNT DIAL
Registers Fractions to 99.9 Turns
FOR roller inductances, INDUC-
TUNERS, fine tuning gear re-
ducers, vacuum and other multistage
variable condensers. One hole mounting. Handy
logging space. Case: 2" x 4". Shaft: 1/4" x 3". TC
2 has 2 3/4" dial — 1 1/2" knob. TC 3 has 3" dial —
2 1/2" knob. Black bakelite.
TC 2 \$4.20 — TC 3 \$4.75 — Spinner Handle 75c extra
Add 12¢ for Parcel Post
R. W. GROTH MFG. CO.
18009 Franklin Ave. Franklin Pk., Illinois

FACTORY AUTHORIZED SERVICE ON RECEIVERS AND TRANSMITTERS

REPAIRS, modernization, calibration and alignment by competent engineers using factory standard instruments. Collins, Globe, Hallicrafters, Hammarlund, Harvey-Wella, National Co. Service representative for Hickok and RCA Test Equipment. Factory parts. All work guaranteed. Our twenty-fourth year.

DOUGLAS INSTRUMENT LABORATORY
176 Norfolk Avenue Boston 19, Mass.



**IF YOUR TOWER AIN'T GOT
DIAGONAL BRACING**

It Ain't Got

*** ITQ**

INERT TORSIONAL QUALITY
"Diagonal bracing resists twisting caused by constant starting and stopping of large rotary beams. Also twisting of tower caused by gusty winds . . . All E-Z Way Towers got "IT Q".

Write for free literature!
E-Z Way Towers
P. O. Box 5491 Tampa, Florida

K4KYL, Knoxville, Tenn. — Openings all over the place on 50 Mc. Called CQ nightly at 145.01 at 2100 and 2200 EST.

K5TQP, Albuquerque, New Mexico — Activity concentrated on preparing for Perseids shower.

WA6BFC, Arcadia, California. — 50 Mc. opened July 29 toward the midwest.

WA6EEO, Los Angeles, Calif. — 144 Mc. open to San Diego.

W6IEY, La Mesa, Calif. — Activity on 2 meters, 220 Mc., and 50 Mc.

W6ORS, Altadena, Calif. — Texas activity on both 50 Mc. and 144 Mc., Convair Pomona Radio Club and San Gabriel Valley Radio Club are working on 1296 Mc. contact via moonbounce with New Zealand.

K6SIX, Los Angeles, Calif. — 50 Mc. worked W5VVF in Texas, copied but did not work K4JGU in Florida, K7MIT in Arizona, K5IQL in New Mexico. K6TRU and K6VWM received a license for 50 Mc. repeater and are experimenting with it at present.

K6TVC, San Gabriel, Calif. — Constructing 2-meter transmitter.

K7BBO, Tacoma, Washington — 50 Mc. activity only.

W7EON, Whitefish, Montana — Worked VE8BY at the Great Slave Lake NWT. VE8BY's signal when first heard showed no signs of aurora flutter but was T9.

K7GZB, Vancouver, Wash. — Would like some information on simple 2300 Mc. gear.

K8BGZ, Lansing, Mich. — Activity on 50 Mc. and 144 Mc. caught the August 1 opening, to W7s. Worked W6EMS, Omaha, Nebraska, for state number 14 and W6YMG Wichita, Kansas for number 15. Heard W5PZ, Omaha and several W2's and W3's.

W5HNQ, Gregory, Mich. — 50 Mc. activity only. Working on 420 Mc. transmitter and receiver.

W8NOH, Grand Rapids, Mich. — Caught the July 15 aurora on both 144 and 50 Mc.

W8PT, Benton Harbor, Mich. — Active on 144, 220 and 432 Mc.

W8PYQ, Battle Creek, Mich. — Completed 100-watt final for 220, caught the July 15, 2-meter aurora; two new states, W4RFR, Tennessee, and W4KDH, Virginia.

K8SUJ, Springfield, Ohio — Activity on 50 Mc. only.

W9GAB, Beloit, Wisconsin — Primary activity has been on 432 Mc. contact with Iowa on 432. Brings total states up

upto 11.

K9GSC, Portage, Wisconsin — Working on new two-meter converter.

K9LCK, Wausau, Wisconsin — Working on 420 Mc. gear.

K9MGV, Lebanon, Indiana — Number of openings on 50 Mc. during July to Texas, Nebraska, La., Tenn., Wyo., Minn., Fla., Mo., Mass., Ohio, Colorado and Kentucky.

K9MWQ, Wausau, Wisconsin — Caught the July 15 aurora for W8, 9's and 8's on 2 meters.

K9RRS, Racine, Wisc. — 50 Mc. operation only.

K9TFJ, Greenwood, Indiana — 50 Mc. activity during July to Missouri, Nebraska, S. Dakota, Cuba, Florida, Texas, La. Many 4's coming in. Called "CQ Ohio" and landed K8MHJ at Cedarville. Also had QSO with W1FCH at Connecticut.

K8GIC, Wichita, Kansas — 6 Meter openings on July 6, 8, 12. Quite dead between the 13th and 27th.

K8RWC, Pittsburg, Kansas — 50 Mc. openings on July 7, 8, 9, 11.

K8WUD, Collyer, Kansas — Heard no signals on six meters during the month of June. (Better check your receiver. — Ed.)

QST

Stability with Simplicity

(Continued from page 13)

so that the v.f.o. may be spotted on frequency without turning on the transmitter. On 80 meters the signal from the v.f.o. without cathode follower is just enough to be used for spotting purposes; on the higher-frequency bands it is necessary to energize the cathode-follower section and the 6DT6-A amplifier.

(Continued on page 168)



Mail the coupon today for your FREE copy

FREE!

LAFAYETTE RADIO'S 324-PAGE 1961 CATALOG

America's "Electronics Shopping Center"
40 years of servicing the Amateur

HERE IT IS — the biggest, best and most comprehensive catalog you can ask for. Immediate delivery at the lowest, money-saving prices.

• Amateur Equipment • Radio and TV Parts and Tubes • Mobile and Fixed Station Equipment • Stereo Hi-Fi Equipment • PA Systems • Industrial Supplies • EXCLUSIVE LAFAYETTE KITS

SATISFACTION GUARANTEED OR MONEY REFUNDED

EASY PAY PLAN—the simplest, and quickest way to get what you want when you want it. As little as \$2 down . . . up to 24 months to pay.

NEW! LAFAYETTE HE-15A CLASS D CITIZENS BAND SUPERHETERODYNE TRANSCEIVER



Completely
Wired
57.50
5.00 Down

- For Industry, Farming, Business, Pleasure
- 5 Crystal Controlled Transmitting Positions
- Tuneable Receiver Over Full 23 Channel Band
- Complete with Transmitting Crystal for Channel 9
- Planetary Vernier Tuning
- Full-Wave Variable Noise Limiter
- High Output Crystal Microphone
- 5-Prong Microphone Jack for Easy Relay Addition

No examination or technical knowledge required—any citizen 18 years or older is eligible for a license. Simply fill out enclosed FCC application. HE-15A size: 10 3/4" x 6 7/8" x 5 7/8". Shpg. wt., 11 lbs.

HE-15A Wired and Tested (less antenna)

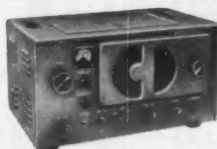
5.00 Down Net **57.50**

HE-19 Whip Antenna Net **3.95**

HE-16 Power Supply for 12 Volts. Net **10.95**

HE-18 Power Supply for 6 Volts. Net **10.95**

LAFAYETTE PROFESSIONAL QUALITY COMMUNICATIONS RECEIVER— ENGINEERED FOR THE AMATEUR



Imported

KT-200
in Kit Form
64.50
5.00 Down

- Superhet Circuit Utilizing 8 Tubes and Rectifier Tube
- Built-in "S" Meter with Adjustment Control
- Band Spread 80 to 10 Meters
- Covers 455kc to 31 mc
- Variable BFO and RF Gain Controls
- Switchable AVC and Automatic Noise Limiter

HE-10
wired
and tested
79.95
5.00 Down

The Communications Receiver that meets every amateur need — available in easy-to-assemble kit form or factory wired and tested. Signal to noise ratio is 10 db at 3.5 MC with 1.25 microvolt signal. Selectivity is -60 db at 10kc, image reflection is -40 db at 3 MC. 7 7/8" x 15" x 9". Shpg. wt., 22 lbs.

LAFAYETTE RADIO

Please include shipping charges with order
165-08 LIBERTY AVENUE, JAMAICA 33, N. Y. • OTHER LOCATIONS

NEW YORK, N. Y.
100 6th Avenue

NEWARK, N. J.
24 Central Avenue

BRONX, N. Y.
542 E. Fordham Rd.

PARAMUS, N. J.
182 Route 17

BOSTON, MASS.
110 Federal Street

PLAINFIELD, N. J.
139 W. 2nd Street



CUT OUT
AND PASTE
ON POST
CARD

Lafayette Radio Dept. VJ6
P.O. Box 190 Jamaica 31, N. Y.

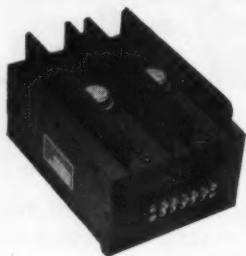
Send me the **FREE 324-Page**
1961 Catalog No. 610

Name _____
Address _____
City _____ Zone _____ State _____

MOBILE POWER SUPPLY

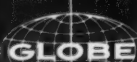
MODEL
A12/600/200

NOW
\$59.50



This 12V input dc to dc transistorized converter is conservatively rated for continuous output of 120 watts at 600V or 300V, or any combination of 600 and 300 volt loads totaling 120 watts.

High efficiency, small size, and light weight, plus freedom from maintenance, conserve your battery and increase the enjoyment of mobile operation.



ELECTRONICS DIVISION
GLOBE INDUSTRIES, INC.
525 MAIN STREET
BELLEVILLE, NEW JERSEY

YES, WE HAVE COLLINS—WILL TRAVEL

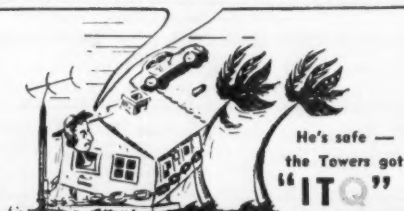
Get in touch with WILSON — "That's All"

QCWA	Willard S. Wilson, Inc.	VWOA
	405 Delaware Ave., Wilmington, Del. W3DQ Est. 1920 K2IUS	

• HAM-SWAP •

"The FASTEST way to buy, sell or swap Ham Gear!"
\$1 a year brings you 24 issues of bargains galore—PLUS the "Fastest Way in the World" to profitably dispose of your old or excess parts and equipment. FREE ad certificate and latest edition returned immediately if you send \$1 now to:
HAM-SWAP, Inc., 35-C East Wacker Drive, Chicago 1, Ill.

"SURE HOPE THE CHAIN HOLDS"



E-Z WAY TOWERS, INC.
P. O. BOX 5491 - TAMPA, FLA.

Performance Considerations

Those interested in circuit details may wonder why a higher-transconductance tube was not used so that the oscillator grid might be tapped farther down on the tuned circuit. Such a tube was tried, but caused instability. Experiment indicated that the medium- μ , medium g_m tube worked best in all cases. Other tubes that can be used for the oscillator-cathode follower are 6SN7-GT, 6CG7, 5692, and 6189. The last two are, of course, premium tubes, and are intended primarily for critical industrial applications.

The performance of the v.f.o., as mentioned before, is exceedingly good. With the coil and capacitors used, the tuning range is nearly linear from 3495 to 4005 kilocycles. The frequency-set capacitor, C_3 , will shift the oscillator frequency about 35 kc. The measured frequency drift after about 3 minutes' warm up was less than 20 cycles in $2\frac{1}{2}$ hours.

QST—

Strays

In the dead of night KN10BL can clearly pick out the call of KN1NYE (his next-door neighbor) in the motor hum of his own refrigerator.

I.A.R.U. News

(Continued from page 75)

medicine and money to the Radio Club de Chile to be distributed among those who needed it. We must mention among others our friend K6SED who made a call to American amateurs, many of them answering with donations. Also sent donations: HC1FG, W4FZC, K2UBG, W4SIB, OD5CL, K5IMF, Radio Association of Western New York, Radio Club Argentino, Association Radio Ecuatoriana, Chatham Kent Amateur Radio Club (Canada), Evans Amateur Radio Club (Angola, New York), and many others.

The Radio Club de Chile most deeply appreciates the help that foreign radio amateurs gave to Chile on those days of misfortune. — *Luis M. Desmaras, CE3AG, Foreign Relations Secretary, Radio Club de Chile.*

Though it is obvious that some of the work done by individual amateurs will never fully come to light, we have a story from the *Pittsburgh Catholic* of July 21, 1960, concerning the service performed by one Chilean amateur, Father Raphael de la Barra, CE7BN. The young priest had gone to a resort on Osorno Volcano to check out a rig. When he made contact with a ham in Valdivia 70 miles north to get a signal report, he was told that a severe earthquake had just struck that city. Quickly he checked with another ham in Puerto Varas, 70 miles south, and found that the southern town has also suffered an earthquake. CE7BN immediately warned the forty tourists at the resort, and most of them fled with the priest. Nine were skeptical and remained on the volcano. The refugees were not out of sight of the building when it was crushed by an

(Continued on page 164)

**CALLING ALL
HAM
HAMATEURS***

*Copyright 1960



Bob Woodrow
WØVVL

GET ACQUAINTED
with the Largest, Most Complete

HAM GEAR HEADQUARTERS

in the Upper Midwest
(Serving the Nation!)

Extra liberal trades mean
lowest end prices...Try us!
CHARGE IT!...10% DOWN!



Joe Hotch
KØUFE

**NEW EQUIPMENT
LITERATURE AND
PRICES SENT ON
REQUEST . . . Rock-
bottom prices on used
equipment.**

Send for list.



Don Gies
KØYEC

THE LINE OF THE MONTH

Nationally Known Nationally Accepted

MODEL HT-32A

A complete table top, high efficiency amateur band transmitter featuring the high frequency crystal sideband filter, bridged Tee sideband modulator, C.T.O. direct reading in kilocycles to less than 300 cycles from reference, CW, AM, S.S.B., unwanted sideband down 50 db or more, distortion down 30 db or more, carrier suppression down 50 db or more, keying circuit for RTTY, and many others. Plate input is 144 watts, for 80, 40, 20, 15 and 10 meter operation.



Precision Built!
hallicrafters
COMMUNICATIONS EQUIPMENT

AVAILABLE FOR IMMEDIATE SHIPMENT

\$695—10% Down
(\$69.50)

\$399.50—10% Down
(\$39.95)

NEW! HA-1 "T.O. KEYS"
(not pictured)
\$79.95—10% Down (\$8.00)



MODEL SX-101A

Less than 1 microvolt sensitivity on all bands and utmost mechanical and electrical stability make the Hallicrafters SX-101A one of the very finest short wave receivers available at any price. It's loaded with features to make DXing a thrill and pleasure. Full gear drive from tuning knob to gang condensers—absolute reliability. 40:1 tuning knob ratio. Five steps of selectivity from 500 cycles to 5000 cycles. Features VHF converter input. Band spread also calibrated for 6 and 2 meters.

THE **Lew Bonn**
COMPANY

MAIL ORDER ADDRESS:
1211 LaSalle, MINNEAPOLIS 3, MINN.
FEDERAL 9-6351

Your Upper Midwest's Complete
Line Industrial Tube Distributor

Before You Buy Any Tower . . .

GET THE FACTS ON
WORLD RADIO'S
SELF-SUPPORTING - SPAULDING
WRL Spire

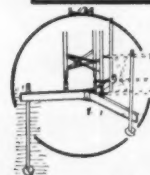


- ★ Self-supporting, 32 - 40 ft. above ground with any full-size 3-element Tribander. May be extended to 120 ft. with proper guying.
- ★ Commercial Grade Construction.
- ★ Streamlined in appearance.
- ★ E-Z "Instant" Installation.
- ★ Extra large, 19 1/2" base width.

AND LOW COST . . .

32' Concrete Mount Model
32 ft. spire with anchor base
as shown: \$75.00

\$5.00 Down
\$49.95
Amateur
Net



For Complete Information, Write To

**WORLD RADIO
LABORATORIES**

3415 W. Broadway • Phone 32 8-1851
Council Bluffs, Iowa

"The World's Largest Distributor of Amateur Radio Equipment"

New! AMECO MOBILE CONVERTERS

Require only 12 volts B+
CRYSTAL CONTROLLED

For any frequency from 2—54 Mc. including 6, 10, 15 and 20 meters, Citizens Band, police, fire, marine, etc.

With the new Ameco Mobile Converters, there is no need to break into the car receiver or to purchase a power supply. All power for the converter is obtained from the 12 volt battery. Anyone can install it. A switch allows the car receiver to operate directly on broadcast or with the converter.

The Ameco Mobile Converter won't become obsolete. Instructions are included to easily change its incoming frequency or to adapt it for home use.

Model CLA uses a 12AD6 and has one microvolt sensitivity for 6 db. signal-plus-noise to noise ratio.
For Citizens Band or 6 meters—wired complete with crystal. Amateur Net **\$19.95**

Model CLB uses a 12AD6 plus a 12EK6 RF stage and has a sensitivity of 0.25 μ v. for 6 db. S+N/N.
For Citizens Band or 6 meters—wired complete with crystal. Amateur Net **\$34.95**
Add \$1.00 for any other frequency.



FREE LITERATURE AVAILABLE
Sold at leading distributors
everywhere or write to
Dept. Q16

AMERICAN ELECTRONICS CO.
178 Herricks Rd., Mineola, L.I., N.Y.

avalanche, the nine seofers buried under fifteen feet of rock. Seldom is there such a clear-out example of the saving of lives through amateur radio.

QST—

Technical Correspondence

(Continued from page 44)

Two things are essential to good n.m.c.w. work. The modulating tone must be low in pitch, below 200 cycles for 20 w.p.m., and decreasing about 20 cycles for each 10 w.p.m. above that. Also, and this is the essence, please, fellows, if you hear an m.c.w. signal, particularly a low-pitched one, when your receiver is set up for a.m., turn up your selectivity to "sharp." This will transform a 3-db. advantage over a.m. to a 14-db. advantage.¹

N.m.c.w. has many advantages to offer as a mode of transmission. While it cannot take the place of c.w. for point-to-point seds and it cannot beat phone for rag-chews, remember, if the band is open, the proper use of n.m.c.w. should be a great aid in working DX. Let's give it a try!

—Raphael Soifer, K2QBW

FREQUENCY VS. AMPLITUDE MODULATION

c/o National Company, Inc.
Malden, Mass.

Technical Editor, QST:

Frequency modulation has enjoyed only limited use by amateurs. Most feel that it is inferior to amplitude modulation for amateur communication purposes and its use has been mainly as a last resort to get out of TVI/BCI trouble, or to avoid the cost of the modulator that is needed to amplitude-modulate a high-powered final. I also suspect that there is a "line of least resistance" factor involved that is a natural human reaction, even with hams who are supposed to be eager and willing to try the unfamiliar and even the impossible. Amplitude modulation is the easy way for the average ham for two reasons: a.m. was the first method of modulation to be put into common use and therefore the most widely developed and understood, and manufactured receivers for many years have included a.m. as the only method of phone reception built directly into the receivers. True, n.f.m. adapters were available as accessories (National has always provided them for its receivers in the past) but they have not been purchased in quantity.

ARRL has published articles in QST on various phases of frequency modulation over the past twenty-five years but the response to these articles has not been gratifying. Unfortunately, the comparison between a.m. and n.f.m. in the chapter on frequency modulation in the Handbook gives some the impression that a.m. has a 6-db. advantage over n.f.m. Many hams will state that they have compared a.m. to n.f.m. on, say, ten meters and that they drew their own conclusions that the a.m. signal was better. These fellows did not use an n.f.m. adapter and made their comparisons with "slope-tuning."

Let us consult Crosby, one of our best authorities on frequency modulation. He states that when a modulation index somewhat greater than 2 is used, the f.m. signal becomes 6 db. superior to the equivalent a.m. signal, when proper f.m. detection is employed. This is the reverse of the commonly-held opinion of f.m., and gets close to the 9-db. figure tossed around by the a.s.b. boys.

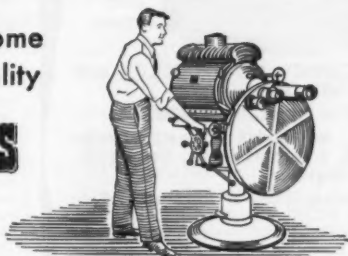
Why this discrepancy? First, let's discuss the logic of the Handbook. We define an n.f.m. signal as one which occupies no more space than the equivalent a.m. signal. Assuming that 3000 cycles is the highest frequency to be transmitted, the maximum bandwidth to be occupied by either signal is 6 kc. Quoting from the 1960 Handbook, "If the modulation index (with single-tone modulation) does not exceed about .6, the most important extra sideband, the second will be at least 20 db. below the unmodulated carrier level and this should represent an effective channel width about equivalent."

(Continued on page 166)

¹ Only catch here is the deliberately poor low-frequency response of most communications receivers. — Ed

in **1930** when home
TV became a reality

**BELDEN WAS
THERE**



From TV's infancy, Belden has been a leading TV wire and cable supplier and has pioneered the development of the efficient camera and microphone cables responsible for today's quality picture and sound transmission.

In every electrical and electronic advancement since 1902, Belden wire and cable engineering has played a vital role.



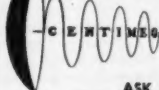
B-4-0

microphone cables
TV camera cables
broadcast audio cables
PA, sound, and intercom cables
control cables
multiple conductor cables for every application
magnet wire • hook-up wire

NEW CENTIMEG'S 6-METER CONVERTER . . . AND THE TA-43 TRIPLER AMPLIFIER FOR 432 MC
\$84.50 (less 2C39A tube, \$69.50)

Dimensions identical with Centimeg's other converters — 8" x 5" x 5" — so this may be used with the PS-C power supply box. Uses a 6ER5/GG in the R.F., and a 6U8A as mixer and oscillator. Also has a potentiometer for manual gain control of the R.F. stage and a pin jack for wiring AVC control from the receiver to the R.F. stage, if desired.

This high-gain, low-noise converter features great reduction in cross talk and excellent reduction of spurious signals. Same high quality Centimeg parts and construction.



Power requirements:
150 v.d.c. @ 33 Ma.,
6.3 v.a.c. @ 1 amp. **\$49.95**

Another Centimeg precision-engineered product in the high-quality tradition . . . excite with any 2-meter transmitter.

Xtal controlled converters: 2 meter, 1 1/4 meter, 432 Mc.

OUTPUT: 14 MC to 18 MC @ 52Ω
26 MC to 30 MC @ 52Ω
30.5 MC to 34.5 MC @ 52Ω **\$69.50 each**
50 MC to 54 MC @ 52Ω

Other I.F. frequencies on request

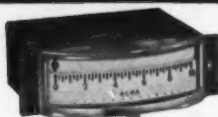
At your dealer's or send check
or money order to

CENTIMEG ELECTRONICS 312 East Imperial Hwy.
El Segundo, Calif.

ASK ABOUT OUR COMPLETE LINE OF VHF-UHF CONVERTERS & TRANSMITTERS

Phone SPing 2-1032

SIDE INDICATOR PANEL METERS



Model
1145
PATENTED

- MAXIMUM ACCURACY AND READABILITY with MINIMUM PANEL SPACE
- FOR HORIZONTAL or VERTICAL MOUNTING
- 3 SIZES . . . Model 1145, 2.7" scale length; Model 1135, 2.1" scale length; Model 1120, 1.2" scale length.

Accuracy held to $\pm 2\%$ of full-scale deflection for dc ($\pm 3\%$ for Model 1120) and $\pm 5\%$ for ac. Dustproof cases. Clear plastic front covers permit maximum light on scale and readability. Wide variety of standard and special ranges, and as Expanded Scale Voltmeters, VU and DB Meters.

SEE YOUR DISTRIBUTOR . . .
OR WRITE DIRECT FOR DATA SHEETS

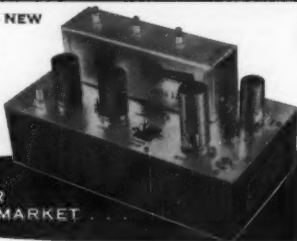
Headquarters for Miniature Components



**international
instruments inc.**

P.O. BOX 2954, NEW HAVEN 15, CONN.

TAPETONE'S NEW
WTC-1296
1/4 METER,
LOW-NOISE
CRYSTAL
MIXER
CONVERTER



NEWEST
CONVERTER
ON THE MARKET

This advanced design approach, seldom used by amateurs but widely used in commercial UHF receivers, achieves outstanding performance. It consists of a double-tuned cavity preselector, followed by a crystal mixer and low-noise IF preamplifier.

SPECIFICATIONS:

NOISE FIGURE: 7.5 DB
GAIN: 20 DB
IMAGE REJECTION: GREATER THAN 40 DB
IF REJECTION: GREATER THAN 80 DB
ALL OTHER REJECTION: GREATER THAN 60 DB
TUBE COMPLEMENT: 12AT7, 6BC4, 6BC5,
12AT7, 6AK5, 1N295

STANDARD MODELS AVAILABLE:

WTC-1296B IF OUTPUT FREQUENCY 50-54 MC
WTC-1296A IF OUTPUT FREQUENCY 51-55 MC
WTC-1296N IF OUTPUT FREQUENCY 30.5-34.5 MC
WTC-1296C IF OUTPUT FREQUENCY 28-32 MC

PRICE \$134.50 (ANY MODEL)
ALSO AVAILABLE: WTC-432 PRICE \$119.50

TAPETONE, INC. 10 ARDLOCK PLACE,
WEBSTER, MASS.

lent to that of an a.m. signal." Further on, it says, "With an index of .6, the amplitude of the first sideband is about 25 per cent of the unmodulated carrier amplitude: this compares with a sideband amplitude of 50 per cent in the case of a 100 per cent modulated a.m. transmitter. So far as effectiveness is concerned, an n.f.m. or p.m. transmitter is about equivalent to a 100 per cent modulated a.m. transmitter at one-fourth the carrier power."¹ This pegs n.f.m. at a 6-db. disadvantage. After reading this, the average ham is convinced that n.f.m. is for the birds. This would be true if hams modulated their transmitters with a 3000-cycle tone. Happily, this is not the case.

In the practical case, 3000-cycle tones are not transmitted by hams, but rather a conglomeration of tones constantly changing in both pitch and amplitude in such a manner as to preclude their insertion into simple formulae. A bass singer can use a greater modulation index than a lyric soprano! Perhaps a fair average tone of modulation would be 1000 cycles. Certainly, the amplitude of the 3000-cycle component of an average voice is much less than the 1000-cycle component, and the average voice will probably swing the 1000-cycle component to a modulation index greater than 2 without at the same time having the 3000-cycle component exceed a modulation index of .6, and the 6-kc. bandwidth limit will not be exceeded. Here we have both the advantage of Crosby and the disadvantage of the *Handbook* mixed together in the same transmission with the relative efficiency of the actual transmitted signal lying between the two extremes.

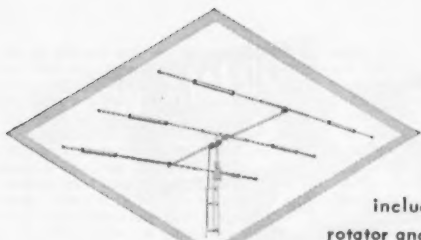
Being unable to substitute the ham's voice into a formula, the best method to obtain a reasonable answer is empirical. In other words, let's try it. The writer did exactly this about ten years ago both on 144 and 220 Mc. Before describing this, I would like to point out one thing that makes the difference between good and poor results when using n.f.m. It is imperative for good results that a clipper be used, followed by a 3-kc. low-pass filter, in the speech amplifier of an n.f.m. modulator. It is amazing what a difference the clipper can make. I would not believe it, at first, until I was shown.

Overmodulation from peaks with n.f.m. raise havoc to a much greater degree than is the case with a.m. Experience has shown that an n.f.m. signal which is unclipped must usually be tuned so far off resonance, on an a.m. receiver, that the signal-to-noise ratio is considerably degraded. With a properly-clipped signal, it is often possible to tune very close to the resonance peak with practically no loss in signal-to-noise ratio with only a very sharp null in the very center to tip off the operator that he is actually receiving an f.m. rather than an a.m. signal. The unclipped f.m. signals have undoubtedly done much to give f.m. a bad name. When the writer decided to try n.f.m. on 2 meters, the transmitter then in use on that band started out with a 5.3-Mc. crystal tripling three times (multiplication of 27) to get to 144 Mc., ending up with 85 watts input to an 829. Following a tip from W1OOP, a 6J5 tube (preceded by a clipper-filter) was resistance-coupled to the screens of the push-pull oscillator. With 12 to 15 volts of a.m. on the oscillator screens, a p.m. signal (rather than f.m., due to the extremely high Q of the crystal) of about 100 cycles was produced. As p.m. causes a rising audio characteristic, the highs had to be cut to produce a reasonably flat audio characteristic. This was done handily by adjusting the screen bypass capacitor to an optimum value. Now, multiplication of the 100 cycles of p.m. by 27 gave the desired -3-kc. deviation at 144 Mc. and the limiting action of three saturated grids wiped off all traces of a.m.

A very satisfactory n.f.m. signal resulted. For receiving, a converter feeding into an NC-173 receiver as an i.f. amplifier was used with an n.f.m. adapter which could be plugged in or out at will for f.m. or a.m. reception. The results with this transmitter were very satisfactory as long as the receiving station was using a conventional receiver for the i.f. (bandwidth of 4 to 6 kc.). Fellows using SCR-522 receivers or Communicators reported that I was only modulating about 10 per cent and on superregens, only a blank carrier was heard.

(Continued on page 168)

¹ The author quotes the *Handbook* in part, leaving out the all-important phrase "with reception methods used by most amateurs." The *Handbook* clearly points out that lack of success with f.m. in competition with a.m. in the ham bands is due largely to the lack of provision for proper f.m. reception in the vast majority of amateur receivers. — Ed.



OCTOBER IS MOSLEY MONTH AT BURGHARDT'S

This is an opportunity you cannot afford to miss, including "World Famous" Mosley antennas along with rotator and tower accessories.

Today's fastest-growing antenna favorites — the carefully engineered, beautifully designed TRAPMASTER beams.

ENJOY
REAL SAVINGS
ON A PACKAGE DEAL
TAILORED FOR
YOU.

Name your figure . . . from \$49.50 to \$99.75.

. . . you can't buy more sock for your signal than a TRAPMASTER delivers.

TA-33 — 3 elements, 10-15-20 M,

rated to 1 KW . . . \$99.75

TA-32 — 2 elements, 10-15-20 M, rated to 1 KW . . . \$69.50

TA-33 Jr. — 3 elements, 10-15-20 M, rated to 300 W. . . \$69.50

TA-32 Jr. — 2 elements, 10-15-20 M,

rated to 300 W. . . \$49.50

Burghardt
RADIO SUPPLY, INC.

P. O. Box 746, Watertown, South Dakota
Phone; TUrner 6-5749

WE STOCK MOSLEY TRAPMASTER VERTICALS TOO!
..... IDEAL FOR LIMITED SPACE.

THESE ARE JUST A FEW OF THE MANY MOSLEY
AMATEUR ANTENNAS AVAILABLE. WRITE TODAY
FOR DETAILS ON THE BURGHARDT REAL-DEAL.



SWARTZLANDER RADIO
LIMITED
FREMONT, OHIO

HALLICRAFTERS
CENTRAL ELECTRONICS
ELMAC — GONSET

WBEP — "JERRY"

New location —
1524 OAK HARBOR RD.
PHONE FE 2-5681

WANTED

Electronic Engineers

Experienced

Military and Marine Communications

SONAR RADIO CORPORATION

3050 West 21st St. • Brooklyn 24, New York

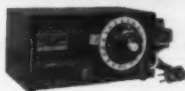
THE QSO THAT

STARTED ME UPWARD FINANCIALLY!

As the skip shortened up on 20 one morning and the VK5 I was QSO QSB'd out, a W8 called me. My contact with him was so long that it could have qualified me for the RCC! But it brought me something much more tangible: from this W8 I learned of the big money many hams are earning in commercial and public-safety 2-way radio maintenance. He told me how several years ago he had sent in a coupon from a Lampkin ad in QST—and received a free copy of "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE". It started him on the road to a high extra income.

So after signing him out in the log, I found and mailed the coupon from a Lampkin ad. Now I, also, am in high-paying mobile-radio maintenance.

Why don't you send in the coupon? It's at the lower right of this ad!



LAMPKIN 105-B
FREQUENCY METER
RANGE 0.1 TO 175
MC AND UP
PRICE \$260.00 NET

LAMPKIN 205-A FM
MODULATION METER
RANGE 25 TO 500 MC
PRICE \$370.00 NET

NEW: The Lampkin PPM Meter
to check frequency on split channels
above 50 MC. Accuracy
0.0001%. Price \$147.00 net.

THE PREFERRED
MOBILE-MAINTENANCE METERS



MAIL
COUPON
TODAY

LAMPKIN LABORATORIES, INC.
BRADENTON, FLA.

LAMPKIN LABORATORIES, INC.
MFB. DIVISION, BRADENTON, FLORIDA
AT NO OBLIGATION TO ME, PLEASE SEND ME "HOW
TO MAKE MONEY IN MOBILE-RADIO MAIN-
TENANCE"—and data on Lampkin Meters.

NAME _____
ADDRESS _____
CITY _____ STATE _____

PURCHASING A HI-FI SYSTEM?

Send Us
Your List of
Components
For A
Package
Quotation

WE WON'T BE
UNDERSOLD

All merchandise is brand new,
factory fresh and guaranteed.

Free H-F4 Catalog

**AIREX
RADIO
CORPORATION**

64-Q Cortlandt St., N. Y. 7

PARTIAL LIST OF BRANDS IN STOCK

Jim Lansing*
Altec Lansing
Electrovoice*
Jensen* Harley
University
Acoustic Research
Janszen* Viking
Wharfedale
U.S. Citizen Band
Gonsel* Hallicrafters
Texas Crystals
Bell* G.E.
Weathers
Herman-Kardon
Eico* Pilot* Fisher
Concertone
Acrosound* Roberts
Bogen* Leak
Dynakit* H. H. Scott
Thorens* *Sherwood*
Dual Changer
Amplex* DeWald
Sony* Challenger
Wollensak* Pentron
Gerrard* Quod*
Miracord* Pickering
Gleaser-Siters
Components
Rok-O-Kut* Tondberg*
Audio Tape
Norelco* Magnecord*
Fairchild* Gray
Rockford Cabinets
Artisan Cabinets
*Fair Traded

CO 7-2137

* TWO-WAY * COMMUNICATION CRYSTALS



**UNCONDITIONALLY
GUARANTEED**
FAST—24 HOUR SERVICE

American specializes in two-way communications. Frequency correlation data for G.E., Motorola, R.C.A., Collins, Globe, Johnson, Lear, Narco, Hallicrafters, Link, Gonsel, Heath, Bendix, Acotron, U.S. Gov't. and many other companies.

FREQUENCY RANGE	CALIBRATION TOLERANCE	PRICE
2501 KC to 9999 KC	.002%	\$3.00
15 MC to 32 MC TM	.0025%	\$3.00
32 MC to 50 MC	.0025%	\$4.00
10 MC to 17 MC Fund	.002%	\$4.00
2001 KC to 2500 KC	.002%	\$4.00
50 MC to 60 MC	.0025%	\$6.00
1000 KC to 2000 KC	.002%	\$7.50

Write for quantity discounts —

AMERICAN CRYSTAL CO.
P.O. BOX 2366 • KANSAS CITY 42, MO.

The same method of modulation was applied to the 220-Mc. transmitter which was also crystal-controlled and tripled three times, with the same good quality n.f.m. signal. This band is worse than 144 Mc. or lower bands for BCI when using a.m. The signal does not need to pass through the i.f. but can get directly in the audio circuit. Note that in the BC or TV set, the leads from the first audio grid to the volume control and back to the audio cathode form a loop that is resonated by the grid-cathode capacity of the tube in the v.h.f./u.h.f. region. This tuned circuit can pick up the v.h.f. energy directly and the more you turn down the volume control the louder the voice becomes, as you are removing resistance in series with this loop and raising its Q. The first audio tube acts as a grid-leak detector. This occurs in TV and BC sets alike, although a.c./d.c. sets are the most vulnerable. Changing from a.m. to f.m. wipes out the effect as the circuit is not a good f.m. detector.

As discussed above, the conclusion was reached that on the v.h.f. bands the n.f.m. signal, properly received, is the equal of the equivalent a.m. signal. On the DX bands, 10 to 80 meters, there is one feature that handicaps f.m. signals. When selective fading occurs on ionospheric transmission paths, a.m. reception is not deteriorated as badly as f.m. reception. The discriminator just will not handle the signal effectively when selective fading is pronounced. Here is where a.s.b. really shines. Selective fading of an a.s.b. signal does not affect the quality nearly as much as for either conventional a.m. or f.m. signals, due to the greater simplicity of the transmitted signal. Further, the newest receivers are apt to have varying slope characteristics of their selectivity (extremely sharp in the case of mechanical filters) as compared to the comparatively standard i.f. selectivity of ten years ago. This means that slope tuning may be unsatisfactory in many instances and an n.f.m. adapter is essential.

The following summarizes the main advantages of f.m. over a.m., particularly as used on the v.h.f. bands:

- 1) Cures BCI and audio TVI.
- 2) Permits modulation of any power with a small receiving tube.
- 3) Permits c.w. ratings for full input. A pair of 4X250Bs will take 1-kw. input with f.m. instead of the 600 watts allowed for a.m. use.
- 4) Does not have to handle modulation voltage peaks of twice the normal carrier amplitude. This means that plate tuning capacitors can be only $\frac{1}{4}$ the size physically, or insulation in coaxial tanks can be $\frac{1}{2}$ as thick.
- 5) Above 52.5 Mc., you can swap signal-to-noise ratio for bandwidth and quieting action by using wideband f.m. This relaxes receiver and transmitter frequency stability tolerances.
- 6) There is no need to worry about linearity of the Class C amplifier. Inefficient grid drive does not cause modulation distortion.

It is hoped that the above discussion will start the reader thinking about the subject of frequency modulation so that he will be more tolerant of the method even though he may not actually use it. It is hoped that the stigma that has handicapped the use of f.m. by amateurs in the past will be removed so that it can enjoy wider use. In particular, the writer feels that v.h.f. men are missing a real good thing by not using f.m. more extensively.

— Cal Hadlock, W1CTW/W1IQD

"HOW TO SOLVE A QUIST QUIZ"

6379 Clara Lee
San Diego 20, Calif.

Technical Editor, QST:

"How To Solve a Quist Quiz," by Peter A. Stark, in your June, 1960, issue was great stuff.

A novel and simpler "simplest" solution is as follows (see figure):

$$IR_2 = \frac{120 - IR_1 R_3}{R_2 + R_3}$$

$$= \frac{120 + 2 \times 12}{32}$$

$$= 3 \text{ amp.}$$

$$ER_2 = 3 \times 20 = 60 \text{ volts.}$$

A voltage drop in R_3 due to current in R_1 equals their
(Continued on page 170)

NEW AMECO

2 & 6 METER CONVERTERS

COMPLETE KIT
AS LOW AS
\$19.95

2-METER FEATURES INCLUDE:

- Crystal controlled.
- New 6ES8 high gain, low noise, cascade first RF amplifier. 6U8A second RF amplifier-mixer. 6AU6 oscillator.
- Spurious and image rejection—over 70 db.
- Noise figure better than 4 db.
- Gain—over 30 db.

6-METER FEATURES INCLUDE:

- Crystal controlled.
- 6BS7 cascade RF amplifier and 6U8A mixer-oscillator.
- Spurious and image rejection—over 70 db.
- Noise figure—better than 4 db.
- Gain—over 20 db.

The Ameco Converters are housed in a compact (2" x 2 1/4" x 5") 2-piece brushed copper chassis. Brings in any signal that can be heard on any commercially available converter. The IF output on both converters are easily changed to allow converter to have any output frequency for hook-up to any receiver. The power requirements of 16 ma. at 100 to 150 volts DC and .85A at 6.3 volts AC for the 6-meter converter or 30 ma. at 100 to 150 volts DC and 1.15A at 6.3 volts AC for the 2-meter converter can be obtained from the receiver or from the Ameco Power Supply. Model PS-1, also housed in a 2-piece copper chassis. Power supply can deliver 50 ma. at 125 volts DC & 2A at 6.3 volts AC & may be used to supply power to many accessories around the ham shack.

10 meter, 15 meter, Citizens band, Police & Fire converters also available

Converter complete with tubes and crystal for 7-11 Mc. or 14-18 Mc. in kit form with instructions.....
WIRED AND TESTED (with tubes and crystal).....
Kit or wired models for any other output frequency (30.5-34.5 Mc., 28-30 Mc., .6-1.6 Mc., etc.)—\$1 extra
Power Supply complete in kit form. Model PS-1.....
WIRED AND TESTED, PS-1W.....

6-meter	2-meter
\$19.95	\$23.95
27.50	33.95
10.50	
11.50	

Sold at Ham Distributors or contacts

AMERICAN ELECTRONICS CO. 178 Herricks Rd. (Dept. Q-10) Mineola, L. I., N. Y.

TELETYPEWRITER EQUIPMENT COLLINS 51J RECEIVERS .54-30.5 MC.

Model #14, 15, 19, 26 & 28 Teletype machines, Teletypewriter Receiving Converter and others. For general information & equipment list write:

Tom WIAFN, ALLTRONICS-HOWARD CO.
Box 19, Boston 1, Mass. Richmond 2-0048



FREE

204 PAGE 1961
B-A CATALOG!

BURSTEIN-APPLIEE CO., 1012 McGEE ST., KANSAS CITY, MO.



DON'T BEAM YOUR SIGNALS AT THE NEIGHBOR'S GARAGE. Rohn Towers, sturdy, heavily galvanized towers get your array over surrounding objects efficiently and inexpensively. Approximately \$2 a ft. You can't build them for that yourself.

G4ZU DX GO-TOGETHERS

"G4ZU PAT."

G4ZU BEAMS + ROHN TOWERS

FOR PROGRESSIVE AMATEURS

IMPORTANT INDIVIDUALLY—TREMENDOUS TOGETHER

G4ZU 20-40 Birdcage now with improved mast and stubbing features climatized against jungle heat and arctic cold—no traps to fail—coax feed.....

\$94.50

G4ZU 10-15-20 Minibeam. Six years of improvement. Proof that a light engineered beam (16 pound) can do the job. Pre-tuned—coax feed. No traps—no coils—no headaches.....

\$89.50

CREDIT AVAILABLE—IMMEDIATE DELIVERY

Rohn 25G Towers (including choice of top section—number standard sections and house bracket) 30 ft. \$64.15 40 ft., \$82.40 50 ft., \$109.65. Rohn Foldover tower (King of them All!) 50 ft., \$186.00 60 ft., \$206.25; 70 ft., \$218.40. Safe—sturdy—reasonable. AR22 rotators (recommended for above.) \$32.75

HOUSE OF ANTENNAS

1153 E. 82nd St., Chicago 19, Ill.
Tel. SO 8-9282

Enclosed is check/m.o. Send immediately to

20/40 Meter Birdcage. Send information
10/15 and 20 Minibeam. Send information
Rohn Tower.....height. Send information

☐ Send beam, \$94.50 ☐
☐ Send beam, \$89.50 ☐
☐ Send tower, \$ ☐

Name.....Call.....

Address.....QS-10

NEW CRANK-OVER ANTENNA HEAD NOW from VESTO!

plus Hurricane-Proof* Construction!

No guy wires!

**Tilts
Heaviest
Beams
To Any Angle**

- Vesto Towers are Easy to Erect
- Hot-Dip Galvanized to Last a Lifetime
- 10 Sizes from 22 ft. to 100 ft.

*No Vesto Tower has ever been damaged by hurricane.



Beam can be easily cranked down to any position. Beam is readily accessible.

EASY PAYMENT PLAN!
Write for new,
FREE literature!

VESTO CO., INC.
20th & Clay St.
North Kansas City, Mo.

DEPENDABLE FREQUENCY CONTROL



WITH
SAVOY
CONTROL
CRYSTALS
for

- CITIZENS BAND USE
 - AMATEUR and CAP
 - AIRLINE and AVIATION
 - TAXICAB and POLICE
 - MARINE RADIOPHONE
 - MILITARY and MISSILE USE
- plus all other requirements where precise and dependable frequency control insure successful, economical operation.

Available for immediate delivery in any type, any frequency, any quantity

Backed by Over 20 Years Experience
Complete information and prices on request
Engineering assistance available

SAVOY ELECTRONICS, Inc.

Subsidiaries of Savoy Industries, Inc.
FT. LAUDERDALE, FLA. GRIFFIN, GEORGIA
Box 7127 - Logan 6-8416 Box 584 - Griffin 9401

product. This drop subtracts from the voltage available across R_2 considered as a series combination, which is possible since the effect of the current through R_1 has been accounted for. — A. C. Hockett.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1AIC, Wendell L. Smith, Meriden, Conn.
W1FZU, Franklyn H. Standish, Middleboro, Mass.
W1GR, Alfred W. Hyde, Cranston, R. I.
W2CVU, Irwin Dreyer, Flushing, N. Y.
W2GJE, Raymond L. Spicer, Wharton, N. J.
W2LZ, Walter D. Wakeman, Walton, N. Y.
W2TID, Leonard E. Young, Attica, N. Y.
ex-W4HLC, Horace B. Greene, Anderson, S. C.
W4IPS, Earl Waldo Strayer, Fairfax, Va.
W4OWS, Lomax G. Sawyer, Coinjock, N. C.
K4YGR, Patrick O. Parker, Griffin, Ga.
W5AES, Isaac C. Bates, Sherman, Texas
W5NUN, Fred A. Gerdes, Oklahoma City, Okla.
W6ANQ, J. Bryson Walker, South Laguna, Calif.
W6QCH, Dr. Claude E. Babcock, Keene, Calif.
W6QK, Robert H. Bell, Fresno, Calif.
W7CQC, Woodrow W. Dehl, Havre, Mont.
ex-W8DLF, Dr. Paul A. Wilkinson, Norwalk, Ohio
W8GFE, Donovan C. Smith, Mt. Healthy, Ohio
W8PLP, Ralph W. L. Ziegenbein, Lansing, Mich.
ex-W9BIA, Robert J. Broten, Buena Park, Calif.
K9OWP, Everett D. Waite, Indianapolis, Ind.
W9VEU, Raymond G. Warczynski, Chicago, Ill.
K8AEC, Neal P. Campbell, Los Alamos, N. Mex.
KN0ZBL, William C. Libor, Minneapolis, Minn.
KP4AVM, John K. Chatfield, Santurce, Puerto Rico
VE2EU, Georges Forest, Montreal, Quebec
VE3RW, T. William Thompson, Belleville, Ont.

In the August issue, we listed in error VK3ACE, Clyde Case of Birchip, Victoria, Australia. Mr. Case is *not* a Silent Key. We apologize for so listing him.

Strays

Long shots. W6ISL, being the youngest ham at the 3825 Picnic in San Diego, was selected to draw the winning ticket for the door prize. Well, for heaven's sake, if you can't guess whose ticket he drew. . . .




WØVUG's XYL felt sorry for her husband as they moved around the country, constantly getting a new call. So when they finally settled down in Chicago, she hooked the rug in the photograph to remind him of the five calls he had had in as many years. The calls, from 1948 to 1953, included: W4OLS in Memphis, Tenn.; W1SEY, Portland, Me.; W3SEY, Baltimore, Md.; W5UHP, Houston, Texas, and W9VUG in Chicago.

QST ADVERTISERS


"Advertising is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's advertising rate card


Amateurs and Electronic Engineers: Practically everything you need can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff.



VACUUM COAXIAL ANTENNA RELAY
End Antenna Relay Problems. A Must For Sideband and Hi Power. Complete with Auxiliary Contacts, \$48. Send for Data Sheet. See page 88, October 1959 QST.
SOUTH BAY ELECTRONICS
3125 Barney Ave., Menlo Park, Calif.



**HAVE YOU GOT MY NEW
TVI BOOK ?**
The 2nd Edition Now Also
Covers Citizens Band TVI
\$1.75 in U.S.A. \$2.00 Foreign
At Your Favorite Dealer or
Direct From Phil WIDBOM
NELSON PUBLISHING CO., Redding Ridge, Conn.



**Are You
TRADING?**



Let me make you a trade-in offer on your used amateur equipment. All name-brand merchandise—late serial numbers assured. Quick delivery.
WRITE TODAY! Bill W9ZSO-KØIUH
COMMUNICATIONS EQUIPMENT CO.
518 State St., LaCrosse, Wis.
Phone 4-7373

CLAROSTAT

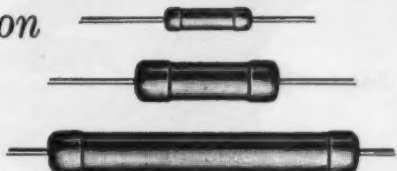
"Fixtohm" 1% precision
resistors*



The finest in deposited-carbon units. 1/2, 1 and 2 watt ratings. Meet applicable MIL specs. Varnish or hot-dipped plastic coatings. Competitively priced.
• Ask for catalog.

CLAROSTAT MFG. CO., INC., Dover, New Hampshire

*Reg. Trademark.



2 AND 6 METERS ON ONE CHASSIS WITH SEPARATE RF SECTIONS LETTINE MODEL 262



Powerful 45 to 50 Watt VHF Transmitter With Mobile Connections and A. C. Supply

The 262 contains the identical RF sections of the 2 meter 242 and the 6 meter 242 transmitters on one chassis, with a single 242 audio and power supply section. The only switching necessary to change bands is in the filament circuit. The separate RF sections make RF switching unnecessary, providing the same high efficiency of single band transmitters. Each RF section has its own tubes and circuits, comprising 4-5763's as oscillators and drivers, 2-6146's as final amplifiers, 12AT7 crystal mike amplifier, 6V6 audio driver, 2-6V6's class B 100% push-pull plate modulator, 5U4G rectifier. Two separate antenna outputs are provided with coaxial connectors on the front of the transmitter. These are connected to swinging links, controllable from the front panel, matching antennas from 52 to 300 ohms. The 262 uses standard 8 mc. crystals and will operate with the Lettine VFO. A socket is provided at the rear for relay connections. Cabinet 8 x 17 x 8 inches. Weight 32 lbs. Will operate mobile from a PE-103 dynamotor. Completely wired and ready to operate.

Price with eleven tubes and two crystals—\$137.50.
Send Full Amount or \$25 With Order—Balance C.O.D.

LETTINE RADIO MFG. CO.

62 BERKLEY STREET VALLEY STREAM, L. I. N. Y.

Looking for
A-1 Reconditioned
EQUIPMENT?

LARGE
STOCKS?
LOWER
PRICES?
FREE
TRIAL?
GUARANTEE?

HENRY HAS IT!

Equipment at both Henry stores may be traded back in 90 days at full price on new equipment. Our time payments save you money because we finance ourselves. Write, phone or visit either Henry store to get better equipment at less cost on better terms.

Henry Radio Stores

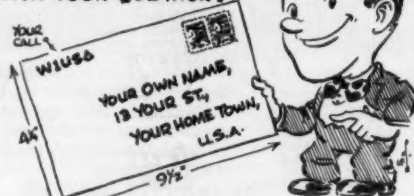
Butler, I. Missouri
ORland 9-3127
11240 West Olympic Blvd.
Los Angeles 64 Ph. GRanite 7-6701

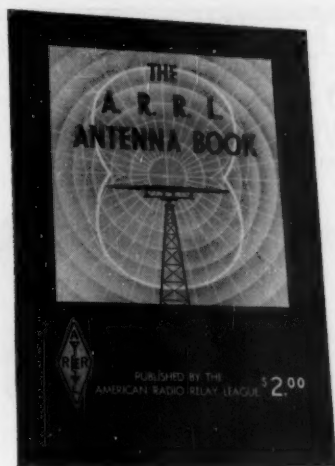
A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

- W1, K1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass.
- W2, K2 — North Jersey DX Ass'n, P. O. Box 666 Hillside, N. J.
- W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
- W6, K6 — San Diego DX Club, Box 16006, San Diego 16, Calif.
- W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
- W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
- W9, K9 — J. F. Oberg, W9DSO, 2601 Gordon Drive, Flossmoor, Ill.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, P.O. Box 653, Halifax, N. S.
- VE2 — George C. Goode, VE2YA, 188 Lakeview Avenue, Pointe Claire, Quebec.
- VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 833 10th St., N., Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 1684 Freeman Rd., Victoria, B. C.
- VE8 — Earl W. Smith, VE8AT, P.O. Box 534, Whitehorse, Y. T.
- VO1 — Ernest Aah, VO1AA, P.O. Box 8, St. John's, Newf.
- VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
- KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
- KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii.
- KL7 — KL7CP, 310-10th Ave., Anchorage, Alaska.
- KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

IS YOURS ON FILE WITH YOUR QSL MGR?





\$2.00

U.S.A. proper

\$2.25 Elsewhere

NEW ... REVISED

THE new, Ninth Edition of the ARRL Antenna Book is just off the presses.

FULLY revised and expanded in line with current practice, this new edition is a complete treatise on the theory and practice of antennas. It leads the reader from fundamental aspects of wave propagation through extensive discussions of antenna and transmission line theory to descriptions of both simple and complex antenna designs. Includes sections on multiband antennas, rotary beams, antennas for v.h.f. and u.h.f., mobile types, long-wire antennas, quads, verticals, plus the fundamentals of all types of antennas.

A BASIC handbook for anyone who is interested in one of the most fascinating questions in amateur radio — how to radiate a stronger signal!

AMERICAN RADIO RELAY LEAGUE, INC.

West Hartford 7, Connecticut



PROTECT YOUR RIG with this compact burglar alarm. Easily installed under the hood of any vehicle. The siren and relay mechanism are enclosed in a heavy, tamper-proof, cast aluminum housing. Operation is simple; the alarm is turned on by a key lock switch usually mounted on the fender. When a door, hood, or trunk lid is opened, the siren alarm sounds and continues until turned off with the key. 6 and 12 volts. Brand new. Postpaid in U.S.A. **\$39.95**

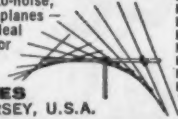
ZIMCO ALARMS

2005 Atlantic Ave., Brooklyn 33, N. Y.
Write or call Herb, K2PAT
Dickens 2-9121 or Jackson 2-2857

New! Telrex "Spiralray"

Extremely high-gain, high signal-to-noise, practically no fade, all radiation planes — horizontal, vertical or oblique! Ideal for scatter-wave, satellite, mobile or point to point work! 50, 108 and 144 megacycle models available

TELREX LABORATORIES
ASBURY PARK 40, NEW JERSEY, U.S.A.



CODE

TELEPLEX METHOD

trains you to hear Code signals just as you hear spoken words — because it teaches Code SOUNDS and not dots and dashes. Thirty words with ease... fifty words with ease... fifty words with ease... Starts beginner or advances your present speed. Try it for yourself and compare with anything else. 40 years' experience teaching Code have made the Teleplex Method far superior to all the cheap "gimmicks" on the market. Write today for details and free trial. You be the Judge! (Improved cabinet design allows new low cost.)



TELEPLEX CO.

739-D Kazmir Court, Modesto, Calif.

Canadian Representative: **THE HAM SHACK**
1269 Granville St., Vancouver, B.C.

NEW Especially Designed for Single Side Band! HIGH VOLTAGE POWER SUPPLY DELIVERS 3500 or 4200 VOLTS DC AT 500 MILS

The high-voltage power supply you've been waiting for! All the power you'll ever need—even for that Alaskan Kilowatt! Especially designed for single side band by one of the leading manufacturers of precision electronic equipment since 1947...No transients due to poor dynamic regulation...No chokes. Write for complete descriptive literature.

MODEL 65A — 4.2 KV — \$365.00

MODEL 65B — 3.5 KV — \$335.00

Send check or money order only—no C.O.D.'s

Amateur Division

TIC Tel-Instrument
ELECTRONICS CORP.

728 GARDEN ST., CARLSTADT, N. J.

Specifications:

INPUT: 115, 208, 230 V. AC; 50-60 cps; single phase

OUTPUT: Model 65A—4200 V. DC @ 500 mls, cont. duty

Model 65B—3500 V. DC @ 500 mls, cont. duty

(350, 750 or 1050 V. screen voltages)

REGULATION: 15%, no load to full load

WEIGHT: Model 65A—150 lbs. net

Model 65B—130 lbs. net

RIPPLE: Nom. 1% at full load

SIZE: 17"x17"x8 1/2" high



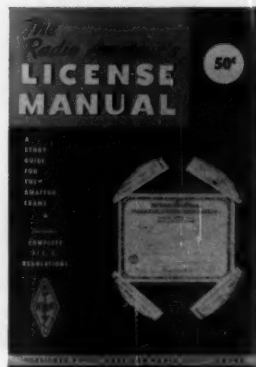
\$64 QUESTIONS?

The ANSWERS?

You'll find them all in . . .

- Q. Is a photocopy of an amateur station license valid during mobile operation?
- Q. How do U.S. amateurs obtain authorization to operate in Canada?
- Q. Under what conditions may applicants for amateur licenses take examinations by mail?
- Q. What are the requirements for portable and mobile operation?

Score 100%? If not, better get the 44th Edition of the License Manual. Complete FCC and International Rules and Regs governing amateur radio . . . detailed explanations of amateur licensing . . . separate study guides for all amateur operator exams. The up-to-date license and regulations manual for all, newcomer and oldtimer alike.



50 cents postpaid

THE AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Connecticut

DX AWARDS! HOW?

DXERAMA

3rd EDITION

See page 127 February 1960 QST.
\$1.60 USA & Possessions \$1.85 Foreign.

Write to Sam Fraim, DXerama
1101 Farmingdale Road, Lancaster, Penna.

RADIO CONSULTING ENGINEER

W8FAZ — Joseph Zelle, AB MA (MS) PE

IRE
AIEE

ARRL

APS
AMS

Practice limited to amateur radio



Telrex 175 RIS — the
★ 2 Stage Boston Gear Reducer
★ 1/12 HP. Motor
★ Selsyn Indicator
"finest low cost rotator on the market!"
\$198.50

TELREX LABORATORIES
ASBURY PARK 40, N. J., U. S. A.

Two hamshacks One Transceiver

All amateur bands from 3.4 to 29.7 mc. SSB or CW . . . 1 kc accuracy . . . 175 watts P.E.P. input on SSB, 160 watts on CW. 18 lbs., 3 oz. Net, only **\$1150.00**. (Power supply and accessories extra.)
EASY TERMS, BIG TRADE-INS • TRY US FIRST!

WRITE TENNY FRECK, W4WL
FRECK RADIO SUPPLY

38 Biltmore Avenue

Phone AL 3-3631

Asheville, North Carolina

AT HOME OR ON THE
HIGHWAY YOU GET
FAMOUS COLLINS
PERFORMANCE WITH
THE MOBILE KWM-2
TRANSCEIVER



SOLAR SYSTEM VI 6 METER TRANSCEIVER



\$189.50 SOLAR ELECTRONICS

149 WOOSTER STREET, NEW YORK 12, NEW YORK

Send for literature giving full details. Representative Inquiries Invited.

TRANSMITTER 12 watts input to 5763 final • All transmitter controls are on the front panel • Both plate and grid of final are metered • Push-to-talk operation • Uses a crystal, ceramic or carbon microphone • Uses popular low cost 8 mc crystals • Provision for a VFO 35-75 ohm output, can be used with car whip • Spotting switch to check your frequency.

RECEIVER Better than 1/2 microvolt sensitivity • Built-in noise limiter • Double-conversion superhet for selectivity and no in band images • I.F.'s of 3 mc and 455 kc • Vernier dial for fine tuning (6:1).

FEATURES Power input: 6 vdc, 12 vdc, & 115 vac • Power supply built right in...no separate mounting, no separate costs • Weighs only 15 pounds...great for trips, vacations • 8" x 6" x 12", fits anywhere • Chassis easily removed for service, nothing hidden • Military type construction for ruggedness • High quality components used throughout • Carrying handle/mounting bracket (for car, boat, or plane) • Removable mounting feet for installation anywhere.



BEAM EXPENSE

can be lowered with a beam designed to last.

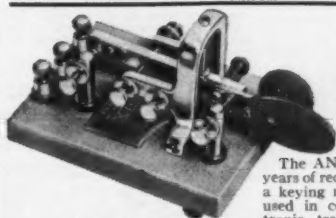
- THREE BAND • TWO BAND
- SINGLE BAND

TENNALAB 417 S. Tenth St.
Quincy, Ill.



? can give you personal service on helping you select better gear per dollar for your operating pleasure. Over 30 years' experience. Big trades, easy terms. Used bargains.

VAN SICKLE RADIO SUPPLY CO.
Gene Van Sickle, W9KJF, Owner
4131 N. Keystone Ave.
On the northeast side of
Indianapolis 5, Indiana



VIBRO-KEYER

The ANSWER to many years of request for parts for a keying mechanism to be used in constructing electronic transmitting units. Features a beautiful beige colored base, 3 1/4" by 4 3/4", weighing 2 3/4 pounds. Same large sized contacts, main frame and super finished parts as the DeLuxe Vibroplex. Red finger and thumb pieces and trunion lever. Adjustable to suit your own requirements. Priced at \$15.95.

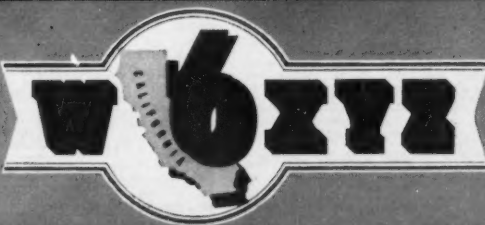
THE VIBROPLEX CO., INC.

833 Broadway

New York 3, N. Y.

FOR THE FIRST TIME... Your Call and home state in a single custom decal!

In six attractive, permanent colors with simple directions for applying. Unequaled in appearance. Ideal gift. For cars, doors, equip., boats, planes, etc. Beautiful design of world available in place of state for Canadian and DX Amateurs.



Price for either design \$1.95 each. Add 4% tax in Calif. Approx. size 3 1/4" x 8". Mailed P.P. within 7 days. No COD's please. Enclose check or M.O. Designate world design if desired. Ask for quote on reproducing your club insignia.

P. O. BOX 3915,
TERMINAL ANNEX

CALL-D-CAL

LOS ANGELES 54,
CALIFORNIA

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

COAXIAL Cable. New surplus RB-54A/U, 58 ohms impedance 30 ft. prepaid, \$1.00. Radio magazines, buy, sell, trade. R. Farmer, 3909 N. Columbia, Plainview, Texas.

ALL types of transmitting and receiving tubes wanted. Also aircraft or ground receivers and transmitters. Hamgear or test equipment. For immediate action for cash write or phone Ted Dames, W2KUW, 308 Hickory St., Arlington, N. J.

MOTOROLA used FM communications equipment bought and sold W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N. Y.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W9RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrman 8-8262.

HAM TV Equipment bought, sold, traded. Al Denison, W1BYX, Rockville, Conn.

CASH for your gear. We buy, trade or sell. We stock Hammarlund, Hallicrafters, National, Johnson, Gonset, Globe, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H. & H Electronic Supply, Inc., 506-510 Kishwaukee St., Rockford, Ill.

"PIG-IN-A-POKE" Not if you visit Ham Headquarters, USA and see and choose from the hundreds of "Like-New" bargains in the world-famous Harrison Trade-In Center. More for your money, because tremendous turnover makes lower overhead! Terms, trades, send postcard for mouth-watering photograph and price list Q-6. For the best in all new and used equipment, it pays to come to "Ham Headquarters, USA". BCNU, 73, Bill Harrison, W2VAA, 225 Greenwich St., New York City, N. Y. KWM1 and a few high plate dissipation tubes wanted, 30471 TH 4-1000A, 600A, etc. Ted Dames, W2KUW, 64 Grand Place, Arlington, N. J.

CASH for used short-wave ham receivers, transmitters and accessories. Treger, W9IVJ, 2023 N. Harlem Ave., Chicago 35, Ill. Tuxedo 9-929.

CHICAGO AND AMATEURS! Factory authorized service for Hallicrafters, Hammarlund, Globe, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halsted St., Chicago Heights, Ill. Tel. SKyline 5-4056.

NEW 4CX1000 in factory-sealed bag with Elmac socket and chimney. First \$95 takes it and I'll pay the postage anywhere in the U.S. K9BLU, Box 77, Rte. 2, Stevensville, Michigan.

WANTED: Old time commercially built and unaltered amateur spark transmitting and audiotone receiving equipment. Al T. O'Neill, Camp Lakeview, Lake City, Minn.

JOHNSON Courier in like-new condx, \$175. W7PSO, P.O. Box 455, Casper, Wyoming.

SELLING Out: All in A-1 condx: BC610, \$125; NC-300, \$225; DX-100B, \$170; Lakeshore Phasemaster II, Bandshopper VFO, \$58, \$225; Jones MicroMatch complete, \$25; Filter King 6M condx, \$25. Misc. items cheap. Gerald Skeen, K8AON, Box 8, Ripley, W. Va.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N. C.

QSLs? SWLS. Finest and largest variety samples 25¢ (refunded). Callbooks: American calls, \$5.00; Foreign, \$3.00. "Religious" QSL samples, 25¢. "Rus" Sakers, W8DED, Box 218, Holland, Mich.

C. FRITZ quality QSLs at low prices! Samples 10¢. Different card-of-the-month every month, at even greater savings. P.O. Box 1684, Scottsdale, Arizona.

QSLs-SWLs that are different, colored, embossed card stock and "Kromekote." Samples 10¢. K8AIA, Turner, Box 953, Hamilton, Ohio.

QSLs. Quality and economy complete samples dime. QSL Printing, Box 12351, Houston 17, Texas.

QSLs. Fine quality. Choose your own combination of 7 styles, 10 card stocks, 8 ink colors, photos, \$2.50 up. Samples dime. Ray, K7HLK, 979 Borah, Twin Falls, Idaho.

QSL-SWLs. Reasonable. Samples 10¢. Glenn Print, Att: M. L. Edmonds, 1103 Pine Heights Ave., Baltimore 29, Md.

QSLs "Brownie." W3CJ1, 3110 Lehigh, Allentown, Penna. Samples, 10¢ with catalogue, 25¢.

QSLs-SWLs. Samples 10¢. Maiso Press, 1937 Glensdale Ave., Toledo 14, Ohio.

QSL's New design, lower prices, fast delivery. Catalog 25¢ (coin only), refundable. Dick Crawford, K6GJM, Box 607, Whittier, Calif.

QSLs. Twenty exclusive designs in 3 colors. Rush \$3 for 100 or \$5 for 200 and get surprise of your life, 48-hour service. Satisfaction guaranteed. Constantine Press, Blacksburg, Md.

CREATIVE QSL and SWL Cards. Are you proud of your card? If not let us print your next order. Write for free samples and booklet. Personal attention given to all requests. Bob Wilkins, Jr., K96ZMT, Creative Printings, P. O. Box 1064-C, Atascadero, Calif.

QSLs-SWLs. Samples free. W4BKT Press, 123 Main, McKenzie, Tenn.

QSLs Samples dime. Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLs. Taprint, Union, Miss.

SUPERIOR QSLs. Samples 10¢. Ham Specialties, Box 3023, Bellaire, Texas.

QSLs. 3-color glossy, 100—\$4.50. Rutgers Varityping Service, 7 Fairfield Rd., New Brunswick, N. J.

QSLs WAT. Box 1, Brecksville, Ohio.

QSL's-SWL's: That are different, colored, embossed card stock, and "Kromekote." Samples 10¢. Turner, K8AIA, Box 953, Hamilton, Ohio.

QSLs-SWLs. Reasonable prices. Samples 10¢. Robert Bull, W1BXT, Arlington, Vt.

QSLs. \$1.00. Riesland, Del Mar, Calif.

QSLs. Lapel pins, samples dime. Kephart W2SPV, 4309 Willis, Merchantville, N. J.

QSLs. SWLS. XYL-OMs (sample assortment approximately 99¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototype, snazzy, unparagoned cards (Wow!). Rogers, K8AAB, 737 Lincoln Ave., St. Paul 5, Minn.

PICTURE QSL Cards of your shack, home, etc., Made from your photograph, 1000, \$13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

GLOSSY QSLs. 100, 4 colors, \$3.50. Others less. Samples 10¢. Dick, W8VXK, 7373 No. M-18, Gladwin, Mich.

DELUXE QSLs. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSLs. Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

QSL's SWLS Nicholas & Son Printery, P.O. Box 11184, Phoenix, Arizona.

QSLs-SWLs. 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo. QSLs-SWLs. Free Samples. Spicer, 4615 Rosedale, Austin 5, Texas.

QSLs. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Sample 10¢. K2VOB Press, 162 Midland Blvd., Maplewood, N. J.

QSLs. 100 for \$3.00. Glossy, distinctive design, Samples free. R. A. Larson Press, 32 Midland Ave., Stamford, Conn.

QSLs: Cartoons, colors, samples 25¢. Chris, W9PPA, 365 Terra Cotta Ave., Crystal Lake, Ill.

DON'T Buy QSLs until you see my free samples. Bolles, 7701 Tisdale, Austin 5, Texas.

ATTRACTIVE QSLs. Pearce, 192 Osborne, Danbury, Conn. QSLs. Samples, dime. Printer, Corwith, Iowa.

QSLs-SWLs. distinctive, reasonable. Samples 10¢. Al-Mar Crafts, Box 6052, Riverton Heights, Wash.

QSLs. Stamp brings samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLs. 100 3-color, \$3.00. Sample sheet, 10¢. RBL Print M.R. 12, Phillipsburg, N. J.

QUALITY QSLs. Samples and prices, 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

RUBBER Stamps for hams, sample impressions, W9UNY, 542 North 93, Milwaukee, Wisconsin.

FAST Service, send stamp for QSL samples. K2 Press, Box 372, Minola, N. Y.

LATEST Designs, quality QSLs. Samples 10¢. Savory Press, 172 Roosevelt Rd., Weymouth, Mass.

QSLs. 300 for 3.95. Free samples. W9SKR, Vesely, RR #1, Box 208-A, Ingleside, Ill.

QSLs. Attractive, colorful. Variety type styles, backgrounds, Samples 10¢. Jack Crandall, K6QAO Press, 5013 Enfield Ave., Encino, Calif.

OUTSTANDING QSLs. Dime. Filmcrafters, Box 304, Martins Ferry, Ohio.

OSL Cards printed in 2-colors on glossy Kromekote cards. Two designs especially for mobile, \$2.75 for each 100 cards, \$4 for sample card and brochure. Williams Printing, P.O. Box 2597, Van Nuys, Calif.

EYECATCHING OSLs—quick! Dollar-saving sample. Dime. Rad/Oprint, Ojai, Calif.

OSLs, Over a million delivered, 100, \$2.75 up. Samples, 10¢. WIGKIP, Pro Candleview Ridge, Danbury, Conn.

QUALITY OSLs, Large variety multi-color samples, 10¢. Don, R50WT, Box 332, Ada, Okla.

OSLs, reasonable, nice designs, samples dime. W2DIH Press, Warrensburg, N. Y.

OSLs: Samples 25¢ (refundable). W6CMN, Wildcat Press, 6077 Beck Ave., North Hollywood, Calif.

RECEIVERS: Repaired and aligned by competent engineers using factory standard instruments. Authorized factory service station for Collins, Hallicrafters, Hammarlund, National, Harvey-Wells. Our twenty-fourth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

SSBERS! Keep up with SSB news and views! Join the Single Sideband Amateur Radio Association, dedicated to furthering good SSB operating; promoting advancement of SSB equipment; and disseminating SSB technical information. Read The Sidebander, official publication of the SSBARA. Issues \$3.00 yearly. Write for membership application sample "Sidebander" to: SSBARA, 12 Elm St., Lynbrook, N. Y.

DON'T Fail FCC tests! Check yourself with a time-tested "Sure-check Test". Novice, \$1.50; General, \$1.75; Extra, \$2.00. We pay the price. Amateur Radio Specialists, 1015 Seventh Ave., Worthington, Minn.

LOWEST Prices: Latest amateur equipment. Factory fresh sealed cartons. Self-addressed stamped envelope for lowest quotation on your needs. HDH Sales Co., 919 High Ridge Rd., Stamford, Conn.

GREAT surplus values! BC-603 Receiver New \$17.00—R-26/ARC5 Rec 3-6 mc New \$12.95, used exc \$7.95—R-27/ARC5 Rec 6-9 mc New \$12.95, used exc \$7.95—BC-659 Transceiver with PE-120 \$19.95—T-47/AR-13 Transmitters 34/AP \$49.00—Sound-Powered Dynamic Phone Pr \$4.75—R-42C Microwave R-11/APR-5 \$39.00—Collins CF1 82-Q for Q-5'er compl. v.tubes & instructions \$3.95—Collins Mod. Xformer 100 watt 811-PP to 813 fms \$3.95—RA-62-C Power Supply A.C. for SCR-522 VHF 110-60 cys. New \$59.50—Kits only for above, \$17.00—Ground-plane VHF antennas 30-200 MC New \$9.95—Hi-Mu Electronics—131 Hamilton St., New Haven, Conn. Store hours 10-5, Sat. 10-12.

TOROIDs: Unused 88 mhy like new. Dollar each. Five, \$4.00, pp. DaPaul, 101 Starview, San Francisco, Calif. After Sept. 1st our address will be at 309 So. Ashton, Millbrae, Calif.

S.S.B. Xfrms, exact type for W2EWL, Special and other sideband units; hermetically sealed, brand new set of 3 for \$3.00. Brand new G-E 100 watt (audio) multi-impedance modulation xfrm (10 lbs.) \$6.25. No. c.o.d. include postage. Send stamp for list of other gear. S. A. Tucker, WZHLT, 51-10 Little Neck Pkwy., Little Neck, N. Y.

FOR Sale: Tickets to the one and only—The Original Syracuse VHF Roundup, October 8, 1960. Write K2TXG, 317 Clover Ridge Drive, Syracuse 6, N. Y.

BEGINNERS. Code memorized in one hour. New method. Used in Armed Services, ham radio, scouting. Ketchum's Hour Code Course \$1.00 postpaid. Money back guaranteed. O. H. Ketchum, 10125 Flora Vista, Bellflower, Calif.

WANTED: 6 to 12 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

ATTENTION Mobiles! Leeco-Neville 6 volt 100 amp. system, \$50; 12 volt amp system \$50; 12 volt 60 amp system, \$60; 12 volt 100 amp syst. \$100. Guaranteed no ex-cite car units. Herbert A. Zimmermann, Jr. K2PAT, 115 Willow St., Brooklyn 1, N. Y. Tel. Dickens 2-9121.

WANTED: Your buy or sell list. State price, condition. Small buyer fee. W2LMS Exchange, D'Amico, 319 Maryland St., Buffalo 1, N. Y.

SAN FRANCISCO and vicinity: Communications receivers repaired and realigned. Guaranteed work. Factory methods. Special problems invited any equipment. Commercial two-way equipment. Factory service Leeco-Neville and Delco alternators. Associated Electronics, 58 South F St., Livermore, Calif. W6KF, Skipper.

FOR Sale: SCR-522 rcvr Ex-mtr w/pwr supply for \$50. Never used. Leshar, 25 No. Market St., Elizabethtown, Penna.

GONSET 2M Communicator: 110V AC, 6V DC, relay operated push-to-talk, separate S-meter, VFO and speech pre-amp. Halo antenna. Excellent condx. Mitchell Katz, W2KPE, N. Y. C. Phone BO 8-0672.

FOR Sale: Gonset III, 6 meters, with mounting rack and Halo, \$200. New York City area. Roy Durso, W2KTG, Boices Lane, Kingston, N. Y.

FREE: Viking mobile VFO. Given to buyer of Viking xmttr and complete mobile pwr. supply. Price \$95.00. Everything still in use and in excellent condx. Stanley Cokas, W1ULR, 36 Edgchill Rd., Swampscott, Mass.

SELL QSTs complete. December 1929 to January 1960. Like-new condx. Best offer. W9EDH.

STOLEN from Don D. Cummins, K4HYV, 216 Shelbourne Towers, Knoxville, Tenn. Viking Ranger, xtal mike, Heath equipment as follows: 0-10" scope, TC-2 tube tester, GD-1 grid dipper, "Q" mult. Reward!

HRO 60T with complete set of coils, spkr, and xtal calibrator, \$400. Model 60T central Electronics SSB exciter \$50; Heath "Q" multiplier, \$5.00. All in perfect condx! First \$440 takes all. Jim Boardman, K9IUL, 710 Euclid Ave., Glen Ellyn, Ill.

HEATH Seneca, new, \$200; 2 new RCA 4CX250Bs with sockets, \$50; will deliver within 75 miles; many others, send stamped addressed envelope for list. K2VEY, 303 Burgess Dr., Saddlebrook, N. J.

HOME Brew half-gallon transmitter. Millen final and exciter, fully metered, regulated supplies; plate modulation, antenna tuner, plus separate 2-meter transmitter, all built into a beautiful 6-foot rack on casters. Forced sale, moving out of state! \$250.00, worth three times as much. Will not ship, sry. W2IYQ, Frank Miller, 70 Vandercil Ave., Island Park, L. I., N. Y. Tel. GE 2-4414.

WANTED: Used standard broadcast station transmitter between 250 and 500 watts. Kenneth Slade, R. 2, Fond du Lac, Wis.

COMPLETE Station, 6 months old, F. W. Valiant, SX-101A, D-104, Vibroplex bug, TA331R, AR22 rotor, World clock coax relay, 4" x 6" metal office desk. First \$750 takes it, will not sell separately. Will ship and send photo W8WAL, Frank Tomasek, 31180 E. Rutland, Birmingham, Mich.

WANTED: Link Mod. 205 and 118X receivers. Motorola FM gear, Bird wattmeter. Sell-wap Lampkins 103, \$75; field strength meter, \$25; modulation meter, \$25; McMurdo Silver receiver 2 and 1 1/4 meters, \$30. B. C. Higley, W20EA, 82 Lower Main, Matawan, N. J.

SACRIFICE Sale: Hallicrafters SX-101, Mark IIIA rcvr, Heath Apache xmttr with SB-10 SSB adapter, Hallicrafters R-46B spkr, Mosley TA-33 Jr. beam, Mosley vertical antenna Mod. V-4-6, CDR rotor, Johnson low-pass filter, Dow coaxial relay, coaxial cable, in little-used condx. Ships complete. Price \$675 cash. WA2FLJ, 2 Union St., Batavia, N. Y.

FOR Sale: Hallicrafters SR-34 transceiver, \$375; Gonset G-43 receiver, \$125.00. K4REO, Rt. #2, Box 451, Salisbury, N. C.

BEST Offer by the 15th over \$60.00 for EE3A, \$20 for Vibroplex chrome DeLuxe. W1WOK.

HY-GAIN Antenna: 80-10M dipole with 1 Kw 72Ω twin lead-in, \$15.95. Webster's wire recorder, \$25.00. W. R. Orin, 108 S. Main, Elk City, Okla.

VIKING 500, factory-wired, 75A4, late model, Tri-Ex, 60 ft. telescoping tower; Ham-M rotator; Heathkit VTM-Ex. Contact or write: Lee Trop, W1ZSZ, Georgia Rd., Weymouth, Mass. Tel. ED 5-0502.

FOR Sale: Hallicrafters Model HT33A linear amplifier, like new condx. No time to use. \$500. Cash and carry. Leslie W. Phipps, W1VAP, Holliston, Mass.

SELL: Hammarlund HQ-110C with matching speaker. In exc. condx. \$180.00. K6SIP, 15530 Loukelton, La Puente, Calif. Tel. ED 3-5641.

SELL: DX-40, \$60; Viking 122 VFO, \$30; Mosley V-4-6 vertical, \$20. Wanted: Viking Ranger, Ken Koval, K9PGC, 4818 Van Buren St., Gary, Ind.

ANTIQUE Radios for sale. Dayton, 1923 Kennedy Magnavox amplifier, Horn spkr, Atwater-Kent, Western Electric. Send 25¢ for photographs. WBSZF, 1323 Plainfield Rd., Cleveland, Ohio. **SELL**: Globe 680A Heath VFO mint condx, slightly off calibration, \$95. K3EWO, 618 Michell St., Ridley Park, Penna. Tel. LE 4-1394.

FOR Sale: NC-125, in perf. condx. \$50. George Levy, Tel. ES 2-8990, 2816 W. 15th St., Brooklyn 24, N. Y.

POSITION: Electronics distributor has an opening for salesman with knowledge of components and ability to sell industrial buyers and engineers. Give complete details. Box 1189, Virginia Radio Supply Co., Inc., Charlottesville, Va.

HORNET Tri-Bander beam TB-500, 1 yr. old, \$25.00. Albert J. Bertolini, 382 Fulton St., Farmingdale, L. I., N. Y.

HAMMARLUND SP-600, \$375; Elmac AF67, PMR7, power supply operates on both 6, 12 or 115 volts. Webster's Band-Spanner, complete mobile less than 6 months old. \$325. 1955 Handbook 813 transmitter, 500 watts, \$175. Paul Sligh, K4UYC, 1504 17th Ave., Columbus, Ga.

SPECIAL. Must sell my KWM-2, 516F2, 516E1, mobile rack, and Mosley MA-3 whip. Retail price \$1602; for only \$1200. Check or money-order. Purchased May 15, 1960. In perf. condx. R. Corbett, 46 Prospect St., Torrington, Conn.

WANTED: Johnson KW with pedestal. State price and condition. J. Power, 21 Holt Circle, Trenton, N. J.

FOR Sale: KWM-1 with noise blanker, AC and DC power supplies, speaker, mobile mount—wire mike, Hy-Gain 3-band Micro-Dipole antenna with Universal Mount, \$650 plus shipping. Joe D. Olson, K6ECZ, 548 South Spring St., Los Angeles 13, Calif.

SELL: Heath DX-40 crystals, mike \$35; Heath VFO, \$15; Mon-Key Electronic Keyer, \$15. All in exc. condx. Write for info. Robert Conant, K4VYC, 3901 Iris St. North, St. Petersburg, Fla.

FOR Sale: Excellent SX-100, \$190; DX-100, \$150. W9HOH, 1107 Elm Street, Glenview, Ill.

COLLEGE! Must sell Viking Ranger, \$50.00; NC-300, \$225.00; HT-31 linear amp., 750 watts on c.w. and SSB, \$230.00. Complete station with other accessories, \$700. Will sell separately. Inquire! Lee Kulick, 570 W. 204th St., New York City 34.

MOBILES: Used Motorola FMT-50D 60 watt units convertible to 6 meters, condx. For information write Mainbrace Co., P.O. Box 53, St. Louis 19, Mo.

FOR Sale: NC-183D with Johnson calibrator, just realigned, perfect in look and operation. \$315. Magnifying glass 173D in August ad. Sry. T. J. Sulas, WA2KZU, 5808-80 St. Elmhurst 73, L. I., N. Y.

SELL: 10A SSB exciter w/QTI and VFO, \$100; Gonset 500W linear, \$150; Heath GD18, \$15; all perfect. Also many parts. Send stamp for list. Lane, K2EGW, KI 3-0301, NYC.

COAXIAL Cable, new 58H—30 ft. length, \$1.00; 180 ft. six lengths, \$5.00. Send postage one pound per length. Radio magazines, buy, sell, trade, R. Farmer, Plainview, Texas.

FOR Sale: Collins 75A2 with speaker and Drake Q-multiplier, \$300. Roger Goodland, W9JHB, 5306 Sunnysbrook, Ft. Wayne, Ind.

FOR Sale: Globe King 500B, \$475 and SX-71, \$125. W9QDI, Poplin, Box 434, RR #2, Belleville, Ill.

COLLINS 32S-1, 516F-2 with speaker, and 75S-1 with blower, \$995, package deal only. B&W L-1001-A in HT-32 cabinet with remotely controlled, beautifully rebuilt BC-610 power supply, \$425. Buy all and also get handsome control console (SWR meter and bridge, 24 hour numerical clock, Lakeshore timer, AC line meter, Conrad monitor), antennas, mike, coax relay, coax etc. for only \$50 more. Will not ship, but can deliver. Southern California. Will consider KWM-1 in trade. Heading for graduate school. Bob Moncrieff, W6ZKR, Box 243, Beaumont, California. Telephone Victor 5-3629 except Friday evening and Saturday.

RECONDITIONED! Terms! Guarantee! Collins 32V3 \$399.00; KWM-1 \$595.00; KWS-1 \$999.00; 75A4 \$499.00; Central Electronics 10B \$109.00; 600L \$299.00; B-W 5100 \$245.00; Gonset 500-W Linear \$149.00; Communicator 111-6 \$199.00; Hallcrafters SX-71 \$135.00; SX-88 \$349.00; SX-101 \$235.00; HT-30 \$309.00; HT-32 \$435.00; HT-33 \$429.00; SR4AC \$249.00; Hammarlund HQ-110 \$180.00; SP600IX \$499.00; HQ140X \$165.00; Heath DX-100 \$189.00; SB-10 \$75.00; Apache \$265.00; Johnson Viking II \$169.00; Pacemaker \$295.00; KW final w/desk \$995.00; National HRO60T \$345.00; NC-98 \$95.00; NC-183D \$234.00; NC-300 \$209.00; Regency ATC-1 \$49.00; TMC GPR90 \$355.00; Globe 65B \$69.00; 6 PMOS \$69.00; Conas, Inc. DSB-100 \$74.50; 300-A \$349.00; 500 \$375.00; 755 \$37.00; Leo, W6GFO, Box 919, Council Bluffs, Iowa, World Radio Laboratories.

1000 W Homebrew transmitter, pair 100TH finals. Complete with modulator, power supply and speech amplifier. VFO included, \$200. Selling because of death of husband. Mrs. M. S. Adams, 1400 Glenwood Terrace, Anniston, Alabama.

SELL: Complete station—74A4 with filters, speaker HT32, Johnson KW 4-400A final; Johnson A.M. amplifier, pad. Telrex Minibeam, Elmac AF67, \$75. K2AKK, 115 Walnut Lane, Manhasset, N. Y.

DX100B, arid block keying, PTT, 4 months old, perfect. Will deliver within 200 miles, \$175; including unopened MK-1 kit. Write Arax, 6121H, 325 Washington Ave., Trenton, Penna.

SALE: Central Electronics 10A multiphase exciter with OT-1, \$100; DX-40 with VF-1 and 2, \$100; 6 PMOS \$69.00; Conas, Inc. condx, WAZFMK, 111 Garfield Ave., Merchantville, N. J.

COLLINS 12 volt DC pwr. supply 516E-1, \$195; Johnson TR switch, \$17. Sidney Ross, W915Y, 1844 N. Rutherford, Chicago 35, Ill.

WANTED: For trade, registered Basset or toy Dachshund puppy. Have new 4-1000A, 4X150A, 4-250A, 8133, etc. Other dogs considered. Phil Lamarche, W9DVM, 6303 Danube Way, Orlando, Fla.

WANTED: Apache or similar transmitter. Also DX-40. Must be reasonable and in good shape. Will pick up in a radius of 300 miles. Ken, VE3CCB, 1593 Dale St., London, Ont., Canada.

KWM-1, AC, DC supply, Collins speaker, Shure mike, mobile rack, Mosley 3-band mobile antenna, cables, 3-band Hi-Gain vert. antenna, \$950, firm. T. W. Samuels, Jr., M.D., 348 West Prairie, Decatur, Ill.

SPECIAL SALE: First come, first served, quantities limited. Give second choices, all new, B&W \$100 demo; 100C, \$185; \$195; 51SB-B, \$180; Globe DSB100(W), \$129.95; DSB100 (K), \$99.95; VOX 10 (W), \$26.35; VOX 10 (K), \$17.50; OT 10 (W), \$8.75; VHF 10 (K), \$10.15; L-1A (W), \$109.50; Scout Deluxe (W), \$129.95; SM90(K), \$10.95; 755A(W), \$51.95; VO 62(K), \$43.95; FCL1 (W), \$21.95; FCL1(K), \$13.50; AT4(W), \$69.95; PBI (W) wired, \$18.95; 90A (wired) \$69.95; 90A(K), \$51.95; 680A(K), \$84.95; 680A(W), \$124.95; PA1(W), \$7.95; 100 (W) G4ZU beams some small parts short, as is, \$25 ea.; Elmac AF67, \$150; Gonset GSB 101 demo, \$420. Tennalab 3-el. beam, \$159.95. Write for quotes if what you want isn't here. Uncle Dave, Ft. Orange Radio Distrib. Co. 904 Broadway, Albany, N. Y.

6 MTR Converter, \$10; 10 mtr. converter, \$8.50; 15 mtr. Pre-selector, \$4.50; W6RET, 8831 Sovereign Road, San Diego 11, Calif.

SELL: 100V, factory guarantee, \$700; KWS-1, modified, \$1,000; M M-2 R.F. analyzer, 455 Kc. \$100. All F.o.b. Lamb, 1219 Yardley Road, Morrisville, Penna.

FOR SALE: Collins 32V-3 in exc. condx. Check for highest amount received before Oct. 15th gets it. Minimum, \$375. You pay shipping. Richard Ross, W2PNI, 141-48 78th Rd., Flushing 67, L. I., N. Y.

FOR SALE: Used NC-300 with xtal calibrator, \$299.50 and factory-wired Viking Valiant, \$349.50. Both for \$600. William Stogdill, W9KWC, 520 N. Coquillard, South Bend, Ind.

SELL: Gotham Tribander, \$32.50; Hickok 288X signal generator, \$215.50; RK4D32, \$20; OF1, \$5. In fine condx. Albert Johnson, K1IHK, Newport, N. H.

FOR SALE: SX-100 like new, in exc. condx, \$195. Two newly built Heathkit 10B-1 VP-1-6, VP-1-12, \$100. Bill Flapan, 6036 N. Francisco, Chicago 30, Ill.

FOR SALE: Johnson Viking Kilowatt, converted with new 4-400As plus desk, \$1000; Viking Ranger with sequence keying, \$175. Also the following new items: PL-172, \$110; PL-184 socket, \$30; Chicago FMS-610 ill. xfmr (for PL-172), \$13; Johnson variable inductance 226-5, \$45; Chicago relator choke SR-500, \$25. Used but in excellent condx; Elmac VVC-2-60-20 variable vacuum condenser. Plate transformer, 110V pri. sec., 4000 volts at 500 Ma. no CT, \$35. Nation, MB-40-SL, \$10. No trades as am moving to Arabia. WIT: J. RFD 5, Danbury, Conn.

SELL: HT-32A, exc. condx, \$425. Return, school. K6POC, Box 902, Ridgecrest, Calif.

COMPLETE station: need the money. All equipment is in perf. condx: Heath DX-40 and VFO, \$170; Hallcrafters SX-99 and R-47 spkr and Heath Q-mult, \$40; Vibroplex Bug, \$15; St. key, \$2; tube cooling fan, \$3.00; home-brew TR switch/Amphenol conn's, \$4.00; earphones, \$2.00; 24 hr. clock, \$6.00 or entire station for \$230.00 or your best offer(s). Pls write for details and pix. Richard Henry, WAZFXF, 21 Oregon Dr., Huntington Sta., L. I., N. Y.

SINGLE Sideband generator as described page 26, August CQ, \$75.00, Longhorn Electronics, Inc. Box 157, Wolfe City, Texas.

NEED 2nd RF section from BC-312 or BC-342 receiver. Andrew J. Dietz, W1RFJ, 134 E. Glenridge Rd., Stratford, Conn.

FOR SALE: Heath DX-20 transmitter, \$25.00; Hallcrafters S-85 rcvr, \$80, like new. John Rybicki, 2238 Spruce Rd., Homewood, Ill.

SELLING: GPR-90 with spkr, \$325; SX-25 with spkr and Q-mult, \$149.00; Viking Ranger, time sequence keying, \$165; RME DB23, \$32.50; Capacitor bridge, \$4.00; pair 110 VAC selsyns, \$7.50; Millen 90801 90 watt bandswitching rig, \$40. Wanted: crank-up tower and antenna rotator, Joseph Marshall, Jr., 22 Clare Dr., East Northport, L. I., N. Y.

TRADE: AF67, PE103, coax relay, Regency ATC-1 converter PS2V power supply 10 meter whip and mount, all complete on KW transmitter commercial or home brew for use with Pacemaker or will sell for \$200. William Baxter, 3702 North First Ave., Tucson, Ariz.

FOR SALE: New, never used, WRL 755 VFO, \$40.00; HT-32, in gud condx, \$495; NC-300 in v. gud condx, \$295. W. B. Sewall, W5YYL, 10711 Stallcup, Dallas, Texas.

FOR SALE: Complete ham station, 75A4 rcvr, 32 and 33 Hallcrafters. Many extras including 20-meter beam. Price \$2000. Cannot ship, sry. W. A. Kuehl, 6647 Kenton, Lincolnwood, Ill.

MASTER Mount #444 and Webster Band spanner, whip, both \$15; Collins 32RA-8 modulator (100 watts) \$40. Master remote matcher \$12; Bassett noise filters, regulator, generator, \$5.00 each. RANA, 55.00. You pay postage. W5FJR, 515 West Main, Houma, La.

FOR SALE: Hammarlund HQ-150, \$220; Elmac equipment AF-67, \$130; PMR-7, \$115; PSR-6-12, \$25; M-1050 (6-12V), \$30; Heath gear AT-1 xmt with SM-90 screen modulator, \$25.00; TC-tube checker, \$22.00. All with instruction booklets and original cartons. TSCF Bill Whitten, W4KIV/6, 13 D Silver Drive, MCB, Twenty-nine Palms, Calif.

FOR SALE: Globe 500A, with speech compressor and external VFO; extra 4-250A, \$395; HROSOT1, six coils, calibrator, \$295. PE103, Old magazines, books, Kineman, 146 Arlington St., Brighton, Mass.

FOR SALE: Heath Mohawk rcvr, \$260; SB-10, \$80; Heath Apache xmt, \$220 or \$525 takes the whole deal. Equipment is in mint condx and performs excellently. Carl Gallo, W2AWI, Director, Lincoln School of Radio & Television, 1851 Broadway, New York 23, N. Y. Tel. Circle 6-5300; home, New Rochelle 6-1488.

FOR SALE: Complete mobile, fixed station 10-80 M. Heath xmt, MT-1; receiver MR-1; power supplies MP-1, UT-1. Best offer takes it. Write to K20BM, 84-10 Main St., Flushing, L. I., N. Y.

HALLCRAFTERS SX-71 and matching speaker, clean, no alterations, and Q multiplier, new, \$130.00, W2BTE, 368 Durham Ct., Union, N. J.

SELL: HQ170, purchased March 1960, never used, \$250. Pick up only. Grossman, 3366 Decatur Ave., N. Y. 67, N. Y.

BRAND New Navy model RDR rcvr, 225 to 395 Mc., built-in 12 volt pwr supply, inc. cables, xtal oven and 150-p manual \$35.00; manual only, postpaid, \$2.50; Permeability tuned oscillator and multiplier sections from Collins ART-13 xmt, both \$10; Bauer Industrial Supply Co., 17170 Redford, Detroit 19, Mich.

COMPLETE 1958-1959 run QSTs, \$5.00, plus postage; \$2.75 per year. Complete 1959 CQ for \$2.00. W2JBL.

HAM Magazine subscriptions: Write W6LJK (Tatum), 1451 Raymond Ave., Glendale, Calif.

ALUMINUM For every ham need. Write to Dick's, 62 Cherry Ave., Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

TRADE: High standard Sport King for S-38C or D or SW-54. Richard Arensmeyer, Rte 2, Choteau, Mont.

SELL Globe-Chief Deluxe, factory-wired and tested, used less than a month: \$50.00. W9DBO, Box 73, Wenona, Ill.

SELLING Out: Collins 32V1, \$250; 32V2, \$300; National NC-173 with spkr, \$100; Gonset 66 and 77 mobile rig, complete with power supplies, \$350.00. A. S. Hatcher, Jr., W4ILG, P.O. Box 156, Macon, Ga.

FOR SALE: Johnson Adventurer, \$30; Johnson screen modulator, \$5.00; VF-1, \$15, all w/manuals, RAL-7 with p/s, \$20, all in excellent condx. Bob Ensminger, 712 Locust, Lodi, Calif.

SELL Or Trade: 900 40-40 ufd dual section electrolytics: 600 mica capacitors, five ratings: 550 paper capacitors; 2 810s, a UTC S-21 modulation xfmr; Stancor xfmrs and swinging choke; tubes, etc. Send for Everything new. Need: SX-99 or equivalent; 250 watt modulation xfmr; main tuning and bandspread dials for SX-28. Dick Fulton, K3KLG, 502 Ogden Ave., Clearfield, Penna.

FOR SALE: DX-40 transmitter, \$65.00. Philip Lupina, 137 Sunset Ave., Newark, N. J. Tel. ES 4-7986.

MOBILE Rig for sale: Heath Cheyenne transmitter, Comanche receiver, MP-1 mobile power supply, Master Mobile antenna matcher, double bumper mount plus miscellaneous extras. Best offer takes. Don Borson, W5ACX.

VALIANT factory-wired, top condition, \$325, also HQ-100 receiver, \$125, both for \$425; transformer one amp at 2500 volts or 5000 volts 220-volt feed parts for KW final. Lyle Marble, Rte. #2, Box 91-A, Bay Minette, Ala.

COMPLETE Station for sale: Globe Scout 90A- \$55; Hallcrafters S-53A, \$65; Both for \$110. Exc. condx. WA2FFC, R.F.D. #3, Millville, N. J.

LEARN the Morse Code in minutes by a proven method. 1960 copyright. Send \$2.00 to: Easy Method Morse System, Box 86, Perrysburg, Ohio.

LEARN Morse Code in 30 minutes! Simple new system, tested and acclaimed by thousands of Radio Operators, Military Personnel and Boy Scouts. Complete code instruction kit only \$1.00. Moneyback guarantee. Send \$1.00 to Code, Box 666, Whittier 8, Calif.

SELL: Two converters NC300C6A and NC300C1, \$25.00 each. Three mechanical filters, F455E60, F455Z4, F455Z5, \$22.50 each. MultiMatch 600w (audio) modulation transformer (UTC) CVM-5, \$45.00. SR500 splatter choke, \$15.00. Prices F.o.b. my address. W8BR1/5, 202 Terrier Ave., White Sands Missile Range, New Mexico.

SELL: National NTE-B exciter (10, 20, 40, 80 meter push-button output) and speech amplifier, \$25.00; home brew VFO, \$7.00; KW antenna tuner, \$20; Mallory VP554 Vibropack, \$7.00; Mallory 6A325 Vibropack, \$6.00; pair Selsyn motors, \$7.00. Shipping charges extra. QST run 1935 to 1953 and other miscellaneous gear, very reasonable. Want: 6N2 transmitter and sud mobile rcvr. W3BS, 1012 Wilde Ave., Drexel Hill, Penna.

KITS Assembled, repaired. For information, write David Goodman, Rte. #3, Box 193, Lakeland, Fla.

HAM Sale: 100 w. mod., 9.95; 6M. converter, \$14.95; Gonset carbon mike, \$8; Dumont oscilloscope cathode-ray tube, 3ACP, \$14; RCA 100 Kc. xtal, \$5.00 and \$50 worth of excit A-1 condx tubes, \$15. Beat those prices: WA2DEA, 88 Cedar Ave., Newark 6, N. Y.

FREE! Sample copy of Ham-Swap! Ham-Swap, Inc., 35-A East Wacker Drive, Chicago 1, Ill.

SELL: Stable SX-100, excellent, \$190. F.o.b. Westover AFB, Mass. W4PDH, Major L. E. Moses, 39C Davis.

COLLINS KWM-1 \$475; \$16F-1, \$75; new condx. John S. Ward, Jeffrey Road, Greenwich, Conn.

SELL KWS-1, spotless condx. \$990. W2AEV, Ray Jones, 111 Hillside Road, Farmingdale, L. I., N. Y.

FOR Sale: HT-32, \$425; HT-33A, \$450; 75A-4, \$475; 2 & 6 Kc. \$25 each; KW Matchbox w/ meter, \$90; C/E MMS-2 scope, \$75; C/E GC-3, \$35; Mel Aichholz, 727 Floral Ave., Terrace Park, Ohio. Tel. 1-252-52.

SELL Hy-Gain 3 element 10-meter beam, perfect condition, \$20. K3MYW, Dr. Mortimer D. Solomon, 41 Westbrook Lane, Roosevelt, N. Y.

KITS Wired: Experienced technicians, advanced facilities. Quality at reasonable rates, 15% plus postage. Precision Electronic Systems Co., Berson, 2800 University Ave., N. Y. C. 68.

GONSET G66B with 3-way power supply, \$150. W2JGV, 116-21 227 St. Camberia Heights 11, N. Y. C.

XTALS. 3rd overtone, \$1.25; 32.16 Mc., 32-36-32.4-32.7. K2OSC, 310 Ann St., Harrison, N. J.

FOR Sale: Complete 6M. station: Heathkit Sixer, 6 and 12 volt power supply and halo antenna. Best offer takes all. K1JZC, Hancock, N. H.

SELL: 75S1, #2152 with CW filter, \$245; 32S1, \$1915 with AC supply, \$350; Elidco 1000F, \$500. W2KOY, 1740 Front St., East Meadow, L. I., N. Y.

SELLING Out: All equipment in excellent optx. condx: DX-100, filter, D-104 mike, \$200; NC-125, spkr and Q multiplier, \$150; Gonset #3220 Triband beam, \$85; Tri-Ex crank-up tower H-471, 71 ft. height, guy wires, thrust bearing, AR22 rotor and 100 ft. of RG8U, \$275. Will consider reasonable offers. Lee, WINNU, 87 Dale Ave., Cranston 10, I. Tel. HO 1-499.

SX-88, \$235.00; NC-98, \$80; Telrex 4-el. beam, \$50.00. A. Berner, 71 Bullard Loop, Ft. Leavenworth, Kans.

SELL: Hallcrafters SX-100, \$200; SX-25, \$45.00; Ultrasky-rider, \$30. Prefer local sale. W2KVL, 138 Cypress, Floral Park, L. I., N. Y. Tel. PR 5-9626.

SELL: Collins KWM-1 transceiver, a.c. power supply, 12 volt d.c. power supply, mobile mounting tray with wire and connectors and speaker, directional wattmeter. Will not sell items separately. Best offer. Write Box 1, West Hartford 7, Conn.

RANGER, W/PTT connections, excellent condx. \$185; new Collins 2-3 MC PTO unit in factory carton, \$29.00. Will ship. W5GYB, 5900 Overlook Dr., Austin 3, Texas.

FOR Sale: Complete mobile station: 50W Gonset Commander, 160 thru 6 meters with coils; Gonset 6M conv., 1400 Kc., I.F. strip with built-in T.N.S., switch and S meter, Cornell Dubilier transistor power supply, 120 w., coax relay, control relays and Shure push-to-talk mike. All 12V. Exc. condx. \$185. Albert Pacifico, K2AWS, P.O. Box 245, Bloomingdale, N. J.

WANTED: Johnson Viking "500" in top condition or kit. State age, condition and best cash price. W1TF, Elmer Turner, 2 Virginia Circle, Reading, Mass.

GONSET GSB-100. Excellent SSB transmitter. Recent serial number. Ship in original container. \$350. Ed Doherty, W1EEB, 25 Rockridge Rd., Waltham, Mass.

CUSTOM Built chassis for your pet project. Free estimates. Mail sketch or print. Browne Elec-Tool Associates, 5501 SW 25th Court, Hollywood, Fla.

KWM-1 and A.C. supply. First certified check for \$525 gets this perfect unit. I'll ship! Sherm Hochman, K9PPY, 2712 N. 41st St., Milwaukee 10, Wis.

WANT: S114; keyboard Morse-tape perforator and sending head, preferably Creed; wire-mounted 100-kc GT-cut xtal. For sale: Wilcox CW-3, unopened crate, with coils, tubes, book, \$25.00; DB-23, \$25; three 4E7Ts, \$6.00 each; three 805s, \$3.00 ea., unused \$280, \$20; unused 416B, \$12. W3AFM, 5800 Hillburne, Chevy Chase, Md.

COILS: R.F., I.F. chokes and toroids wound to your specifications. Any quantity. Barrett Coil Company, Inc. 1611 West Smith Ave., Orlando, Fla.

SELL: Viking II with VFO and Matchbox. Also HQ-140 receiver, all in mint condition, \$400.00. Will swap for SSB equipment. A. Ostrochovsky, W2UPY, 70 Rea Ave., Ext., Hawthorne, N. J.

ELMAC A54 all band transmitter with complete dynamotor supply, relays, etc. Vv mud condx. \$85.00. W8PLO, 9854 Ziaazae Rd., Cincinnati, Ohio.

SALE: Hammarlund HQ-110 receiver with speaker, Handbook, orig. ctn., used month; SWR bridge AM-2, Handbook; LP filter; Dow Key relay, Amphenol connectors on cables for hookup, \$200 package. F.o.b. Bridgeton, N. J. A. Diamant, 28 Devonshire Place.

HEATHKIT Mohawk rcvr, \$210; 6 Mtr. conv., \$20.00; DX-20, \$25. Bruce Charles, Ill. Tech. Men's Dorm, 71 E. 32nd St., Chicago, Ill.

COLLINS Station: 30S-1, \$1200; 75S-1 with noise blanker, \$120; 128-1, \$500; 516F-2, AC supply, \$90; 312B-4 control spkr, \$150; Central Electronics MM-2, scope, \$100; Telret "Monarch" Tribander TB5-626, \$205; Ham-M rotor, \$85; Johnson TR switch, \$20; Johnson S2 ohm low-pass filter, \$10; Auto filter, \$10; 100 ft. of RG8U, \$20; 100 ft. of RG58, \$10; K7EPD, 3850 E. Elm Tel. CR 9-2824. All above equipment in perfect condx. On the air less than 50 hours.

FOR Sale: Viking Ranger and DX-40. Both are extra good. Want: 6M Communicator. C. Gerst, 2674 W. 25th St., Cleveland 13, Ohio.

SELL: Mobile station including Heath MT-1, transistor power supply, Gonset Super 12 converter, VSWR meter and interconnecting hardware. Complete, \$195. Deane KWM-1, Wagner, K2YOR, 4003 Hahn Ave., Bethpage, L.I., N. Y. Phone FErshing 5-8903.

KWS-1, #970, \$1195; 75A-4 w/spkr, \$545—both on air and available for pickup, \$1695; new 312B-4 station control in box, \$175; BC-312N AC powered \$45; RCA 155A oscilloscope, \$45; CDK AR-22 rotor, used only 2 mos., \$25.00; 300 ft. new RG11U cable, \$30; Underwood office mill, \$55; VOM meter, \$15. Tecraft P1 converter pwr supply, used 2 mos., \$15. Frank WA2FMC, Rte. 111, Smithtown, N. Y. Tel. Andrew 5-2538.

HALLCRAFTERS SX-101A, \$295; HT-32, \$425; HT-33A, \$545; Central Electronics MM-2, \$85; Johnson KJlowatt Matchbox with coupler, \$95; Ham-M rotator, \$85; 2-element Tri-bander Hy-Gain beam with 100 ft. coax, \$35.00; Bud low-pass filter, \$10. All perfect. Very little usage. New in appearance and in operating performance. Ken Reiter, K9DBL, 240 Powell, Clarendon Hills, Ill.

SELL: Globe Scout 65B, \$60.00; Globe Antenna Matchbox, \$10; bus, \$10 or best offer for any item listed. K4LXT, Williamson, Connetot, N. C.

KWS-1 latest modifications, perfect, \$1025.00; 75A-4, \$475; new 100 w. unopened carton, \$625; 32S-1 unopened carton \$275; HT-37, \$365. W8WGA, 3451 Ridge Ave., Dayton 14, Ohio.

VIKING II with matching VFO, used less than 150 hours since reconditioned, \$200 or best offer. Wanted: call letter or standard license plates. K9JOQ.

KNIGHT R-100, less than 25 hours use, with xtal calibr., \$120 or your best offer. C. Hunsicker, 255 F. Pringle Circle, Green Cove Springs, Fla.

WANT to sell: 32V2, in exec. condx, with spare final tube, \$275, W6CQF, Russell Dye, 1011 Boland Dr., St. Louis 17, Mo.

KWS-1, D-104 and change-over relay, \$1050; 125 watt Kenyon mod. xfrm, \$15; B&W KW butterfly, nut. plates and jack box, \$15. Hank, W2OZD, 3 Elizabeth Lane, West Paterson, N. J. Tel. Lambert 3-0991.

QST. Complete run July 1923 to date. Cash and carry—\$100. George Kirchhoff, 169 Riverside Island, Fox Lake, Ill.

EX-W5HO. The famous SSB, talking dog and Geo. W. Fahrubel, now K4DP, 1004 Drake Ave., S.E., Huntsville, Ala.

SELL: Year old DX-20 with ext. pwr. supply, jack and BC-348-R rcvr, \$20 each or best offer. You pay shipps costs. W6VJZ, 902 San Benito, Berkeley, Calif.

CITIZENS Band Gonset G11, never used, 12v mobile, and one base station—\$89 each. K2BYB, 14 Cody St., Fords, N. J.

COLLINS 75S-1. In new condx. \$375. W7NOI, 1126 S.W. Curry St., Portland 1, Ore.

WILL Sacrifice Gonset GSB-100, like new condx, for \$295. In orig. carton. Used very few hours. First check buys. Claude Goodman, Jr., W5KWC, 1803 South Marais, Dallas, Texas.

FOR Sale: Viking II xmr. Like-new appearance and condx. With instrux book, \$159. Fred Mehl, W9PYZ, 11460 West 73rd Pl., LaGrange, Ill.

NEED Money for college! Must sacrifice complete SSB station: TX-1 "Apache" and SB-10, in perf. condx, exc. SX-100 w/R46B spkr, brand new AR-22 rotator and 100 ft. coax. Dow-Key coax relay, Johnson filter and 100 ft. RG-8/U coax. Best offer \$550 plus shipping. Charles P. Brooks, K9KOC, 2268 Shannondale Dr., Libertyville, Ill.

NC240CS receiver w/spkr in top condx. Money back guarantee. W0ZHI, 2444 D. Lincoln, Nebr.

FOR Sale: One AF68 Elmac xmt, including pwr supply; one Gonset G66B, one 6 mtr. converter, all for \$375, full price. M. J. Smith, P.O. Box 3434 Term. Annex, Los Angeles 54, Calif.

SELL: BC-221 frequency meter, power supply and modulator, \$85. E. Rogalla, 730 11th St., Peru, Ill.

SELL: Edico SSB 1000 kilowatt linear. Perfect condx. gray cabinet, half original price. \$385. K2CIV, Tom Patterson, 50 Crescent Lane, Roslyn Heights, L.I., N.Y.

SELL: Heathkit "Apache", exc. condx. SX-99 rcvr and accessories. Write K8GCK, 201 Summit St., Spring Lake, Mich. SELL: HR060T, standard coils plus BC band and Hy-Gain 10 M. and 15 M. coils. NBFM adaptor, xtal calibrator, 60SC-2 comb. snkr and coil storage rack. Reg. amateur net. \$860. Good as new, goes for \$475. W2ADN, Lockport, Ill.

SELL: Ranger (new), \$225; Harvey-Wells TB550D with pwr. supply, \$60; Health AC-1 antenna coupler (new), \$12; Want: gnd Viking I. K2DZS, 58 Wayside Lane, Trenton 8, N.J.

FOR Sale: Johnson Kilowatt, speech amplifier, spare tubes and power divider, \$950; Collins 75A4 with new spkr, No. 2157, \$495; Hammarlund 132-129X with matching spkr, \$139. All the above in vy good condx. Charles S. Fleming, P.O. Box 88, Forrest City, Arkansas.

COLLINS 3251 transmitter, \$480; 75S1, \$390; 75A4 with 800 and 3.1 filters, speaker and vernier knob, \$485. All equipment in "as new" condx. Reason: buying KWM-2, Chet Kucyn, W2BTP, 34 Dumbarton Drive, Huntington, N.Y.

FOR Sale: Elco 720, VF-1 with power supply, brand new, \$85. W. Reynolds, 351 N. Elm St., W. Bridgewater, Mass. W1AJG.

SELL: mobile outfit. Stancor transmitter ST203A alt. volt. control with manual; 60SC Shure mike; PE103 filter; entire pwr. supply and complete AC power supply. Entire package \$37.50. W2FKF, Center 9-4278.

SELL: Big rig power supply components. Transformer 2500-0-2500 V. each side, 10 and 2.5V secondaries, 115V. primary. Gnd for 300 and 100 M. 32 Two big oil filled 2.5 amp. transformers 3000 D.C. working volts each \$6.00; all three items, \$39. Crating for shipment, \$3.00. WSAMK, Box 31, Temple, Texas.

HIGHLY Effective home-study review for FCF Commercial Phone exams. Free literature. Wallace Cook (Q-10) Box 10634, Jackson 9, Miss.

"HORSE trader" Ed Moory (W5BDR) will not be undersold: HT-37 used 4 hours, \$359; like new NC-300, \$189; HQ-170C, new, \$239; Johnson Thunderbolt, new in sealed carton, \$459; KWM-2 Ser. #777 Demonstrator, \$895; Collins 32S-1 Ser. 2320, used 2 hours, \$499; matching supply 516-F-2, \$85; 30S-1 linear two weeks old, Ser. #425, \$1155; new Viking Ranger V199; money back guarantee. We pay shipping charge. Terms: Cash, no trades. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHITNEY 6-2820.

KWS1, like new condx, high serial number, make fair offer: HT32A, \$525; Model B "slicer", \$50; RME152A tunable converter 2, 10 and 10 meters, \$400; Telrex 20 mtr. beam, 3' boom, like new, \$75; 30 watt SSB exciter with Collins filter, exc. constr., with VFO, \$75. Several 2-meter xmtrs. 60, 80 or 100 watts new Alliance antenna rotator, \$18; three linear amplifiers, one 400 watts used 4-6146 in parallel built-in nice cabinet with scope, linear amplifier 4-837 tubes in grounded grid, 811 grounded grid amplifier. AM open to offers. All prices F.O.B. W2JMH, 23 Locust Ave., Eatontown, N.J.

75A4 serial 2251, \$500; 75A2 serial 1642, \$325; IKW AM 813S, P.P. final 810s mod. with Viking Ranger exciter, \$450. Peter Chowka, 10 Mansfield Place, Darien, Conn. Tel. OL 5-4570.

FOR Sale: Northern Radio Mod. 115 variable master oscillator: 2-32 Mc. in four bands. Five unit vernier freq. adjuster, similar to BC-221. Oscillator in exc. condx. Used commercially for stable receiver and transmitter control. Excellent for frequency meter or driving transmitter or heterodyne exciter. Oria, cost \$800. Mint condx. \$235 F.O.B. San Antonio. Manual airmailed upon receipt of \$50 deposit. Balance C.O.D. express. Inquire D. B. Olson, W9EAM, Box 65, Von Ormy, Texas.

BIG Sweep: Collins 310-C-2 VFO, orig. power supply, buffer, \$100; Gonset Commander xmt 2 to 54 Mc., \$70; Mallory 6V Vibrapack, 300V 200 Ma., \$18; Gonset G66 rcvr, pack with spkr, 12 and 117V, \$140; Mamecor, professional, 36" rack cabinet; PFG-1, PFG-AH, PFG-M separate take-up panel and motors for 10 1/2" reels, \$300; DuMont 241 oscilloscope 5, 10 cycles to 2 Mc., \$75. Precise 300 oscilloscope, 1 DC to 5 Mc. \$80. Measurements 84 Signal Generator 300 to 1000 Mc AM and pulse modulation, \$135; cash or trade. Can use filter SSB exciter, foldover mast, 144, 220 hp-power lines, lab grade test equipment. R. C. Morris, W2ACH, 41 Peters Ave., Hempstead, L.I., N.Y.

HAM Licenses, resident courses. Novices and General classes, 3 evenings weekly. Polytech Institute, 117 East 11th St., N.Y. 3, Tel. GR 3-6900.

SX-42, \$125 or offer. 10-15 meter mobile xmt, \$30. PB-1, \$10. W2RPN, 809 Peach, Vineland, N.J.

MOBILE Equipment: Palco Bantam 65-A xmt, PMR7 rcvr, and M-1070 AD-DC supply to power both. \$325. Dale Conrad, Apt. 5, 1525 Arapahoe, Boulder, Colo.

HQ-129X excl., \$135; Viking Adventurer, Knight VFO, plate modulator, excl., \$75; Vibroplex bug, \$15; Astatic mike, \$5. free ARC-5 w xmt or rcvr. Write for bargain sheet. K2GBH.

FOR Sale: Viking Valiant, perfect mechanical and electrical condx, \$300. F.O.B. WSHWU, 4025 Tallman SE, Grand Rapids 8, Mich.

FOR Sale: All in excellent condx. National NC-183D receiver, \$240; Hallicrafters SP-44 Pacemaker adaptor, \$45; RME DB-22A Preset selector, \$45; Silverstone 2-speed tape recorder, complete with mike and cables, \$50; Phonotric battery operated tape recorder, new, cost \$70. Will take \$35 complete with speaker, mike and cord. Dyer Matlock, 2702 Westwood Ave., Nashville 12, Tenn.

JOHNSON 10-meter Messenger, used three hours. \$135. WHINE, Malvern, Penna.

COMPLETE File of QST for sale: 1915-1951, Landa, R2, Clayton, Ga.

FOR Sale: BC-221 w/AC. pwr. \$60; NC-300, \$225; HQ-110, \$196.50; HQ-110C, \$203.50; P & H LA-400 linear, \$145; Heath VFO, \$15; RME 4350 w/matching spkr, \$185; Viking Valiant, \$335; DX-100, \$165; HQ-160, \$279.50; HT-32, \$450; Johnson 6N2 converter (14-18 Mc. cond), \$47.50; Elco 720, \$92.50; Heath SB-10, \$75; Knight VFO, \$26.50; SX-101, \$250; Viking Ranger, \$195; Johnson Matchstick (like new), \$65; 75A4, \$550; KWM-2, \$195; 32V-2, \$330; Collins 310B-3, \$149.50; Viking III, \$169.50; 20A w/455 VFO, \$225; Alpha 6 (6 meter xmt, f/w), \$64.50; Write Art Brown, W9IHZ, Brown Electronics, Inc., 1032 Broadway, Ft. Wayne, Ind.

KWS-1, \$1200. In top condx. W2ADD.

CRYSTALS Airmailed: SSB, MARS, Marine, Net, Novice, Commercial, etc. Custom finished FT-243, 01% any kilocycle (\$500 to \$600, \$1.49 (10 or more) 99¢; all Novice 99¢, 1700 to 30,000, \$1.95, all frequencies 60 addt. for HC-6/u hermetic holders. Builders crystal packages: November QST "Phasing Sidebander, \$9.95; June 1958 QST "SSB Package", 5 mixer FT-243, \$9.95, hermetics, \$13.95, 7 matched filter, \$6.90 set. All types, if you don't see it be specific, write, Airmailing 9¢ per crystal. Crystals since 1933, C-W Crystals, Box 2065Q, El Monte, Calif.

COMPLETE Stations for sale. Hammarlund Super Pro rcvr with rack panels, Globe Scout 680A, Globe 755A VFO, mike and accessories. First offer over \$200. Will sell separately if you quote your price. Also, complete mobile station: Palco "Bantam" transmitter, 65 watts all-band operation; Gonset Super Six converter; Gonset noise-chopper; PE-101 dynamotor, all cables included. First offer over \$200. Will deliver both units within 100 miles. Tony Morris, 1629 Yale Station, New Haven, Conn.

SELL: Apache, \$225; Mohawk, \$250 or \$450 for both. Excellent condx. Must sacrifice for college funds. K3HMP, P.O. Box 38, Jersey, N.J.

SELL: Gonset 6 mtr. Comm., III, \$190; DX-40, \$55; VF-1, \$15 or both for \$65.00. All in excellent like-new condx. Earl J. Pysher, Box 144, Bangor, Penna.

DON'T Like lone after all. Brand new perfect DX-40, \$65. Bill Kane, K2VIB, 85 South Main St., Pittsford, N.Y.

SELL: Heath AC-1, \$200; SX-99 with spkr, \$100; Mosley 4-band grid plane vertical, \$15; Heath Commanche with spkr, \$100; Slim-Jim mobile whip and loading coil, \$15. Gene Rupp, K8MZV/2, 68 Mitchell Ave., East Meadow, L. I., N. Y. Phone IVanhoe 9-1575.

SELL: Complete station: DX-40, \$55.00; WRL-75 (VFO), \$24; NC-109, \$147. All like new. Will ship prepaid. KN3MKF, 615 Maryland Ave., Aldan, Penna.

DX-40, AR-3, dipole: excellent, \$95. F.O.B. Piedmont, Ala. King Butler, 506 3rd Ave.

JOHNSON Valiant, like new condx, \$300. John Mansheim, 1311 Ave. B, Ft. Madison, Iowa.

SALE: Globe King 500C, new, \$590; new Birdcage GAZU beam, \$55; 8 el. 2 mtr. beam and rotator, \$22; W2LFB, 13 Shepard Pl., Nutley, N. J. Phone North 7-7552.

NC-193-D with built-in 2 meter converter and spkr, \$235; Viking 1000 factory V1 with push-to-talk with mike and spare 4D12, \$135; VF-1 10, W2CWX, T. J. McCormick, 109 S. Potomac St., Hagerstown, Md.

WILL Trade, Century Graphic 2 1/4 x 3 1/4 with Ektar lens. Also Delux enlarger 2 1/4 x 3 1/4, For DX-40 with VFO or AM xmt or ?? W2AGXL, Box 85, Montville, N. J.

RADAR Type SU1, new tested, and working. Will trade or sell. W2QYV, 138 Hillcrest Ave., Summit, N. J.

CANADIANS: HT32A, \$575; SX101M3, \$375. Both as new, in original cartons. Both for \$900. P. Huber, VE7APN, Vancouver, B. C., Canada.

DEFECTIVE Commercial SSB exciter or transceiver wanted. K2OYN, 449 Hill Street, Bonton, N. J.

COLLINS Receivers reconditioned: \$115, \$675; \$112, \$495; 75A-4, \$545; R-725 similar to R-390, \$75; SP-600X26, \$145; Signal Generator LX-1, \$49; Hickok, #188, \$69; Ranger, \$210; Teletype printers, converters, etc. SX-111, \$205. Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

SELL: DX-35 and VF-1. In excellent physical and working condx: \$60 plus shipping. K5TST, 1717 East "31st", North Little Rock, Arkansas.

FOR Sale: C.W. mixer, 6AG7, 6V6, 813, fully wired, new parts, \$45.00; Par-Metal rack, panels, shelves, 40 ft. high, \$20; 125w. mod. trans. VTC CM45, driver 3-8 used, both, \$20; trans. cond. and chokes for three power supplies, high, low and mod. \$25. Local W2ADC, Box 201, Elmont, N. Y.

SELL: NC-303 like new, \$325.00; Viking Valiant, factory-wired, bought in 1960. A great buy at \$325, with D-104 mike, K2VXG, Walter Komsa, 92 Maple Ave., Wallington, N. J.

GLOBE-SCOUT 66 kmtr. Knight VFO, Knight R100 rcvr w/s-meter and stat. calibrator, in xmt condx, accept any reasonable offer. Chuck Tyskhok, COMMCO, HQBN, 2nd MARDIV, Camp Lejeune, N. C.

CANADIANS: For sale, 40 ft. self-supporting aluminum tower, 4 1/4 ft. sq. at the base, 8 in. square at the top. Complete w/37 ft. 2-in. pipe, thrust bearing and 1/4 in. guy wire for guying if necessary. \$125. Elexer heavy-duty rotor, 500 RBS, complete with control box and 75 ft. of cable, \$300; 88 ft. of Andrews type HQ Heliax cable with type N fittings both ends, \$100; special collins 3-el. wide spaced 20 m. beam, only six months use, \$150; matching Collins element wide spaced 15 mtr. beam, brand new, still in wood crate, \$125. Will sell both beams together for \$250. For further info contact, Martin Rosenbaum, VE3MR, P.O. Box 508, Postal Station "F", Toronto 5, Ont.

KWS-1 (\$1.050); 75A4, three filters, 270G-3 spkr, (\$575); all units in top condition. R. Matthews, 4246 Woodfield Lane, Cedar Rapids, Iowa.

FB, Compact, Exciter, Navigator, \$110 H. S. Robb, W0BHA, Bird Island, Minn.

SALE: Globe 65A Hallicrafters S-86, in gud condx, \$50 ea. Leon Lutz, Roberts College, North Chili, N. Y.

COMPLETE 180 watt SSB/140 watt AM/180 watt c.w. station for sale. SX-101A with 2 spkrs, 4 months old; B&W 5100B and 515B-B; D-104 mike, Mosley Tribander beam, TA-33SR and AR-22 rotor, all complete, you pick up. Sry no shipping, \$875. Will also sell separately. Henry P. Seal K2-EIO/1, 96 Mayflower Ave., Stamford, Conn. Tel. Davis 5-3451.

SALE: Los Angeles or vicinity. Capitol Radio Institute Radio Engineering courses. In perfect condx. Complete course in radio engineering. Complete course in advanced radio broadcast engineering. Complete course in mathematics, algebra through calculus. Cost \$311. Best offer over \$60. Pick up. Write 724 North Crescent Hts. Blvd. Hollywood 46, Calif.

SELL: HRO-60R: nine coils 50 k.c. to 30 Mc., bandspread A.B.C.D.—spkr, coil box. Crack not included \$325.00. Prefer local but will ship. W8QMN, 5918 Salem, Cincinnati, Ohio.

GLOBE SCOUT 680, factory-wired, \$65. David Koch, 472 Fair St., Berea, Ohio. BE 4-9105.

SELL: DX-40 xmt, excellent modulation, in tip-top condx, \$55.00. Mark Steil, K9TGO, 906 Monroe Ave., River Forest, Ill.

FOR Sale: CBM-52314-A driver unit, from OGA-I Sonar equipment; 615, 815, 807a, push-pull parallel 888 into line, 300 lbs. of audio and power supplies. All tubes included. Excellent, make offer. Arthur R. Koch, W2RMA, RD #3, Meadow Drive, Clay, N. Y.

CASH Only: 75A4 receiver \$500. Central Electronics 20A SSBSC exciter \$125. Wilcox Gay two speed track tape-recorder, \$600. Vacuum variable, 20-675 ald, 10-000-3,000 volts, \$34.00. Prices do not include shipping. Write to C. J. Mozzochi, WILYO, Room 13 Hurley Hall, University of Connecticut, Storrs, Conn.

SELL: HQ-110 in exc. condx, \$150; ship collect. C. A. Smith, K5MGD, 1635 Longview, Wichita Falls, Texas.

WANT: Harvey-Wells APS-50 power supply, RME VHF-152 converter. Durant Imboden, 2210 Grand, San Diego 9, Calif.

CRYSTALS for 2-80 meters; 25 cents each. Send for frequency list Stancor power xtrmr 1200 v.c.t. at 200 Ma, plus filament windings, \$4.75 each plus postage. W6IMC, 210 Alden Rd., Hayward, Calif.

WORLD'S best reconditioned equipment. Shipped on approval. Trades. Terms financed by us. Central 20A \$159.00, Collins 75A-1 \$229.00, 75A-2 \$299.00, 32V-3 \$349.00, 75S-1 \$399.00, 2S-1 \$449.00, KWM-1 \$549.00, Drake 1-A \$199.00, Eimac PMR-7 \$119.00, AF-67 \$129.00, Globe Chief \$139.00, Globe Scout \$59.00, Hallicrafters S-76 \$99.00, SX-99 \$109.00, SX-100 \$159.00, SX-101 \$279.00, HT-32 \$429.00, HT-32A \$499.00, HT-33A \$575.00, Hammarlund HQ-100 \$129.00, HQ-129X \$149.00, HQ-110 \$189.00, HQ-150 \$219.00, HQ-170 \$289.00, HQ-160 \$289.00, Heath DX-35 \$49.00, DX-40 \$65.00, SB-10 \$89.00, DX-100 \$179.00, RX-1 \$199.00, Apache \$239.00, Johnson Adventurer \$39.00, Viking \$179.00, Valiant \$279.00, National NC-173 \$99.00, NC-300 \$209.00, HRO-60 \$349.00. Many other items. List free. Henry Radio, Butler, Mo.

COLLINS 75A-1 amateur receiver, \$200; Johnson Viking Ranger, \$175; Naval type CRV 43067, radio xmttr, rcvr (xtals absent), \$15.00; Naval type CRV 50248 modulator-dynamotor (modulator absent), \$5.00; CRV 23485 remote control unit w/key, \$5.00; Vibroplex key, \$10. Everything like new condx. Mickey Weems, Box 728, West Columbia, Texas.

GONSET Super-12 mobile converter, sell \$42. In new condition. George Greenstein, 640 West 231st St., Bronx, N. Y. Tel. KI 8-4270.

SELL: Globe Scout 680, in gud condx, used only 20 hours, \$85.00. Bob Blettenberg, 258 Day Ave., Fairview, N. J.

WANTED: Hallicrafters SX-42 or SX-62 receiver. I have SX-71 to sell or trade. Bob Hanway, 823 Vermont Avenue, Fairmont, West Virginia.

FOR Sale: Viking Valiant, in excellent condx: \$295; tube checker, I-177-A with MX-949 adapter, like new condx, \$35. All inquiries will be answered. W3YPL, 104 Johns Ave., Gettysburg, Penna.

BC-348 Receiver, in gud condx, \$30. Bill Woellner, KN8VUH, 7198 Kenwood Rd., Cincinnati 36, Ohio.

SALE: Need the room. 250 copies of QST & CQ 1946-1958, 18¢ each prepaid, not continuous run, some dual copies, write for list. 1 new 8005, \$2.50, slightly used 75TL, \$2.50, 200 receiving tubes, 24¢ each, write for list. Kclaughlin 50 Kc SSB I.F. transformers set, \$10, including 50 Kc audio filter, 5 Mc. double air tuned IF's, \$1.00 each; Collins 456 Kc IF's with taps primary and secondary, \$1.00 each. Surplus xtals, set of 4 for double lattice 400 Kc-415 Kc range, \$2.00 set. Jennings, P.O. Box 7152, Greensboro, N. C.

CLEANLY Wired, almost new Ranger xmttr, \$200; Gonset G66 mobile rcvr with Universal power supply, \$190; Gonset six-meter Communicator III, \$200. F.o.b. 3130 Daisy, El Paso, Texas. Pete Williams, K5MBZ.

LIMITED Quantity. Model BBC-15 15 mtr. converters. Electrically and mechanically perfect. Some slight scratches on base. See article in the Nov. 1959 CQ p. 100 and QST ad. \$15.00. PPD in U.S.A. Walt Clevestine, Spring City, Penna.

THUNDERBOLT, factory-wired ser. No. 96000. Purchased new in 1960. With swamping pad and relay. New condition, \$450. Will ship express prepaid in original cartons. J. White, K4NBJ, Box 127, St. Paul, Va.

United We Stand...



Have You Signed Up Any New Members Lately?

As the old greeting-song goes, "The more we stick together, the happier we will be." The more members your League has, the more prestige it enjoys; the more prestige it has, the better it can protect our privileges; the better it protects our privileges, the more fun you and I get out of ham radio. Start your own membership campaign soon.

P.S. Don't forget that additional licensed amateurs residing in the same household with a full member may join the League for only \$1—without having to obtain a subscription to QST.

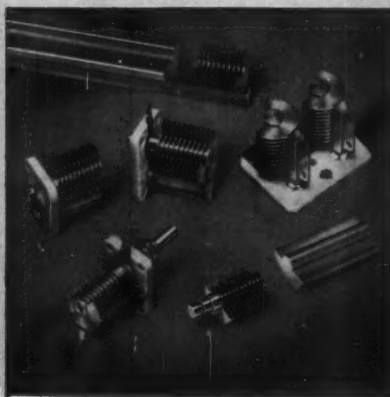
QST and ARRL Membership \$5
\$5.25 in Canada, \$6 elsewhere

THE AMERICAN RADIO
RELAY LEAGUE, INC.
West Hartford 7, Connecticut

Designed for



Application



**NO. 25000 SERIES
HIGH Q MINIATURE
VARIABLE AIR CAPACITORS**

High Q at high frequencies. Rotors and Stators precision machined from extruded solid brass. Terminal integral part of Stator block. Shaft an integral part of Rotor. Screw-driver slot adjustment or $\frac{1}{8}$ " extended shaft for knob. Only 6 parts to a complete Capacitor. Stock sizes 15, 25 & 35 mmfd. single or dual units.

**JAMES MILLEN
MFG. CO., INC.**

MAIN OFFICE AND FACTORY
**MALDEN
MASSACHUSETTS**



Index of Advertisers

ACF Electronics Div.	116
Adirondack Radio Supply	151
Airex Radio	168
Allied Radio Corp.	184
Alttronics-Howard Co.	169
Amateur Electronic Supply	150
American Crystal Co.	168
American Electronics Co.	164, 169
American Radio Relay League	114, 136, 148, 171, 173, 174, 181
Arrow Electronics, Inc.	122, 141
Ashe Radio Co., Walter	152
Barker & Williamson, Inc.	142, 146
Barrington Electronics	154
Barry Electronics Corp.	134
Belden Mfg. Co.	165
Bonn Co., Le.	163
British Radio Electronics, Ltd.	156
Brown Electronics, Inc.	132
Burgess Battery Company	138
Burghardt Radio Supply	167
Burstein-Applebee Co.	169
Call-D-Cal	175
Centimeg Electronics	165
Central Electronics	113
Claronat Mfg. Co., Inc.	171
Collins Radio Co.	2
Communication Products Co., Inc.	183
Communications Equipment Co.	171
Cornell-Dubilier Electric Corp.	124
Cosmos Industries	122
Crawford Radio, The	158
Cubex Co.	148
Cush Craft	144
Custom Electronics, Inc.	152
Douglas Instrument Lab.	160
Dow-Key Co. Inc., The	154
D'Serama	174
Edwards Co., W. H.	154
Elco	129
Eitel-McCullough, Inc.	4
Electro-Voice, Inc.	125
Electronic Supply	155
Electrophysics Corp.	142
Epsilon Records	156
Evans Radio	168
E-Z Way Towers	108, 156, 158, 160, 162
Finney Co., The	127
Fort Orange Radio Distributing Co., Inc.	157
Freck Radio & Supply Co.	174
Gardner & Co.	144
General Electric Co.	100
Glas-Line Co., The	140
Globe Industries, Inc. (Electronics Div. (Belleville, N. J.)	162
Gonset Div.	107, 117
Gotham	104, 105
Groth Mfg. Co., R. W.	160
Hallcrafters Co., The	1, 95
Ham-Swap	162
Hammamfund Mfg. Co., Inc.	109, 160
Harrison Radio	149
Harvey Radio Co., Inc.	145
Heath Co., The	101, 103
Henry Radio Stores	137, 172
Hornet Antenna Products Co.	123
House of Antennas	169
Instructograph Co., Inc.	148
International Instruments, Inc.	148
Johnson Co., E. F.	96-99
Key Electronics	159
Knights Co., The James	131
KTV Tower & Communication Equipment Co.	146
Lafayette Radio	161
Lamokin Labs, Inc.	167
Lettine Radio Mfg. Co.	172
L W Electronic Lab.	110
Master Mechanic Mfg. Co.	136
Master Mobile Mounts, Inc.	133
Mercury Enterprises	158
Millen Mfg. Co., Inc., James	182
Mosley Electronics, Inc.	111, 119
National Radio Co., Inc.	Cov. III
Neil Co., The	126
Nelson Publishing Co.	171
North Hills Electronics, Inc.	154
Organs & Electronics	134
P & H Electronics, Inc.	130
Pausan Co.	138
Penta Labs, Inc.	135
Petersen Radio Co., Inc.	5
Radio Shack Corp.	139, 147
Raytheon Mfg. Co.	106
RCA Electron. Instr. Div.	Cov. I
Rider Publisher, Inc., John F.	150, 153
Savoy Electronics, Inc.	170
Shure Bros., Inc.	128
Skyline Products	130
Solar Electronics Corp.	175
Sonar Radio Corp.	167
South Bay Electronics Co.	171
Swartzlander Radio, Ltd.	167
Sylvania Electric Products, Inc.	112
Tapcode	152
Tapetone, Inc.	166
Technical Materiel Corp.	7
Tecraft	118
Tel-Instrument Electronics Corp.	173
Teleplex	173
Telex, Inc.	115, 150, 173, 174
Tennalab	175
United Transformer Corp.	Cov. II
Van Sickle Radio Supply Co.	175
Vesto Co., Inc.	170
Vibroplex Co., Inc., The	140, 175
Webster Electric	144
Webster Mfg. Co.	160
Wilson, Inc., Willard S.	162
World Radio Labs.	143, 164
Zelle, Joseph	174
Zimco Alarms	173

STATIONMASTER[®] ANTENNAS

— unsurpassed
performance
in business
and industry

Cat. No. 200-509 Collinear Gain Antenna Specifications

- Frequency Range 144-174 Mc
- Omnidirectional Gain 5.8 db
- Maximum power input 500 watts
- Nominal input impedance 50 ohms
- Bandwidth $\pm 0.3\%$
- VSWR 1.5:1
- Rated wind velocity 100 MPH
- Weight 30 lbs.
- Element housing length 19'

Communication Antenna Systems for American Business

Communication Products Company, Inc.

MARLBORO

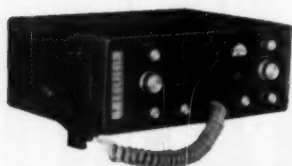
•

NEW JERSEY

get in on the VHF fun at

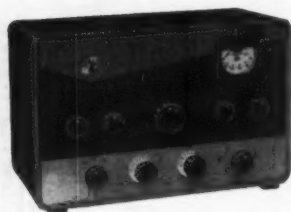
ALLIED-

your best supply source



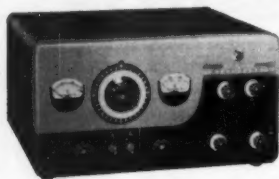
GONSET COMMUNICATOR IV

2 Meter Transceiver
Stock No. 78 SZ 152 \$369.50



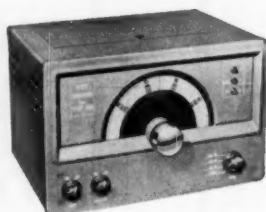
**JOHNSON VIKING
"6N2" TRANSMITTER**

6 & 2 Meter Transmitter
No. 94 SU 851. Wired . . \$169.50
No. 83 SU 844. Kit. . . . 129.50



**JOHNSON VIKING
"6N2" THUNDERBOLT**

K.W. Power Amplifier
No. 77 SZ 840. Wired . . \$589.50
No. 77 SZ 841. Kit. . . . 524.50



**RME VHF-126
CONVERTER**

6, 2, 1 1/4 Meter
Tunable Converter
Stock No. 83 SU 598 . . . \$239.00

**IN STOCK FOR
IMMEDIATE DELIVERY**

We also carry a complete line of Tecraft VHF Transmitter-Converters, as well as Hy-Gain, Telrex and Mosley VHF antennas

HERE'S WHY YOU DO BEST AT ALLIED

ONLY \$2 DOWN on orders up to \$50; only \$5 down on orders up to \$200; only \$10 down over \$200. Up to 24 months to pay...

FOR THAT BEST DEAL on the new equipment you want, write to Jim Sommerville, W9WHF, c/o Allied, or stop in at our Ham Shack and meet Joe Huffman, W9BHD, Joe Gizzi, W9HLA, Jack Schneider, W8CZE...

HAM-TO-HAM HELP—Our staff of 35 Hams will go all-out to give you the help you want, whether you write or call in or visit us in person. You'll like the friendly attention and interest you get *all-ways* at Allied.

See the complete selection of VHF gear in the 1961 Allied Catalog. If you haven't a copy, write for it today.

our 40th year of service
to Amateurs



order from

ALLIED RADIO

100 N. Western Ave., Dept. 15-K
Chicago 80, Ill.



Photographed in true color

THE "COSMIC BLUE" NATIONAL'S NEW HAMBAND RECEIVER

This newest and finest precision double conversion amateur receiver with 6 meter coverage, brings you an ease of sideband tuning previously available only in the most expensive equipment. The NC-270 features an exclusive "Ferrite Filter" for instant upper-lower SSB selection and a degree of selectivity to conquer even the toughest AM and CW signal conditions. The solid $\frac{1}{8}$ " steel panel, ceramic coil forms, double-spaced tuning gang, and full ventilation cabinet combine to give mechanical and thermal stability that will surprise even the most critical operator. Even the color of the NC-270 is outstandingly different, National's new duo-tone "Cosmic Blue." Write for detailed specifications.

Only \$24.99 down*



And National Radio's patented "Flip Foot" makes operating the NC-270 so easy.

Suggested cash price: \$249.95. NTS-3 Matching Speaker: \$19.95 (slightly higher west of the Rockies and outside the U.S.A.). *Most National distributors offer budget terms and trade-in allowances.

NATIONAL RADIO COMPANY, INC.



A WHOLLY OWNED SUBSIDIARY OF NATIONAL CO., INC.

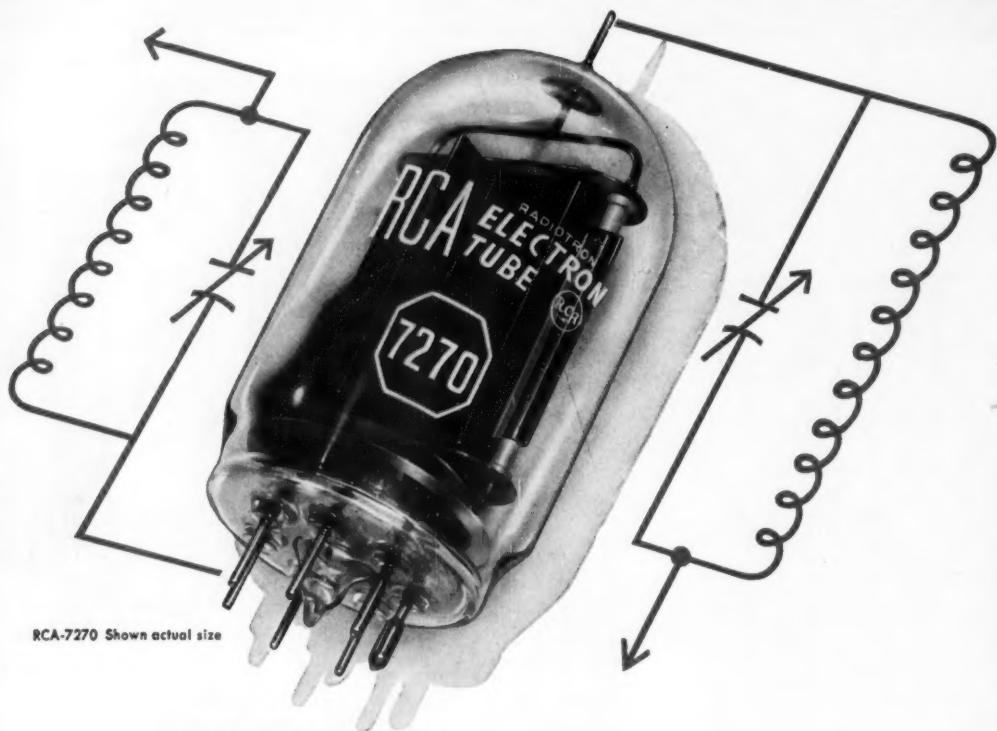
MELROSE 76, MASS.

Export: AD AURIEMA, INC., 85 Broad St., New York, N. Y.

Canada: CANADIAN MARCONI CO., 830 Bayview Ave., Toronto 17, Ont.

"FERRITE FILTER" PATENT PENDING

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



RCA-7270 Shown actual size

The **FIRST** High-Perveance **"300-WATT"** Input Beam Power Tube ...ever designed for Amateurs

- 315 watts CW input up to 60 Mc • 235 watts CW input up to 175 Mc

Fix your eyes on this—one of the sweetest little beam power tubes ever designed and built for an amateur medium-power transmitter.

Here, in a compact unit no bigger than a child's fist, is an all-new tube that takes over a *quarter KW* input to 2 meters. High-perveance design—an original RCA development—enables you to get maximum power with a plate voltage of only 1350 volts. High power gain makes it easy to drive one RCA-7270 (or two in push-pull or parallel) with a single RCA-2E26 or -5763 through 10 meters—or a single 2E26 for 6- and 2-meter operation.

Check the chart for a quick appraisal of the RCA-7270's capabilities. For a complete technical bulletin on SSB, AM and CW use, qsl, RCA Commercial Engineering, Sec. J-37-M, Harrison, N. J.

Typical Operation in Amateur Service to 54 Mc

Type of Service	CW	AM	SSB (AB1)▲
Heater Volts	6.3	6.3	6.3
DC Plate Volts	1250	1000	1250
DC Grid No. 2 Volts	300	400	400
DC Grid No. 1 Volts	-80	-107	-50
DC Plate Ma	250	190	185*
Required Driver Power Output Watts (approx.)	4	4	4.5*
Useful Output Watts (approx.)●	225	130	135*

*Max. Signal Value ▲With Single-Tone Modulation
 ●Measured at load of output circuit having 90% efficiency



RADIO CORPORATION OF AMERICA

® Electron Tube Division

Harrison, N. J.

Another Example of RCA's Contribution to Amateur Radio

